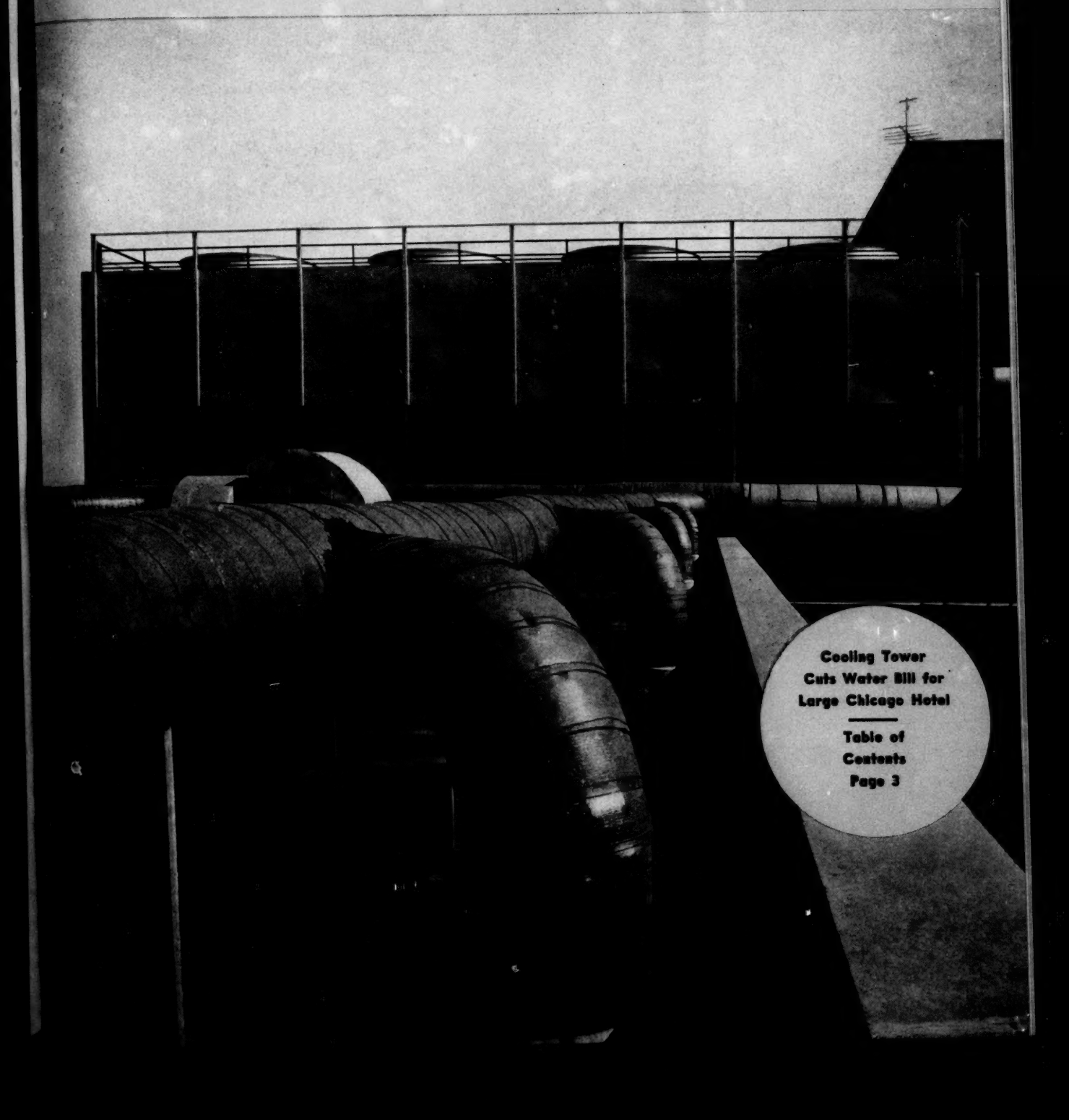
AIR CONDITIONING HEATING AND VENTILATING

MARCH, 1957—54th Year



Cooling Tower Cuts Water Bill for Large Chicago Hotel

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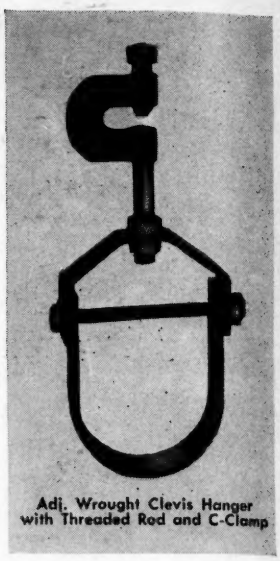
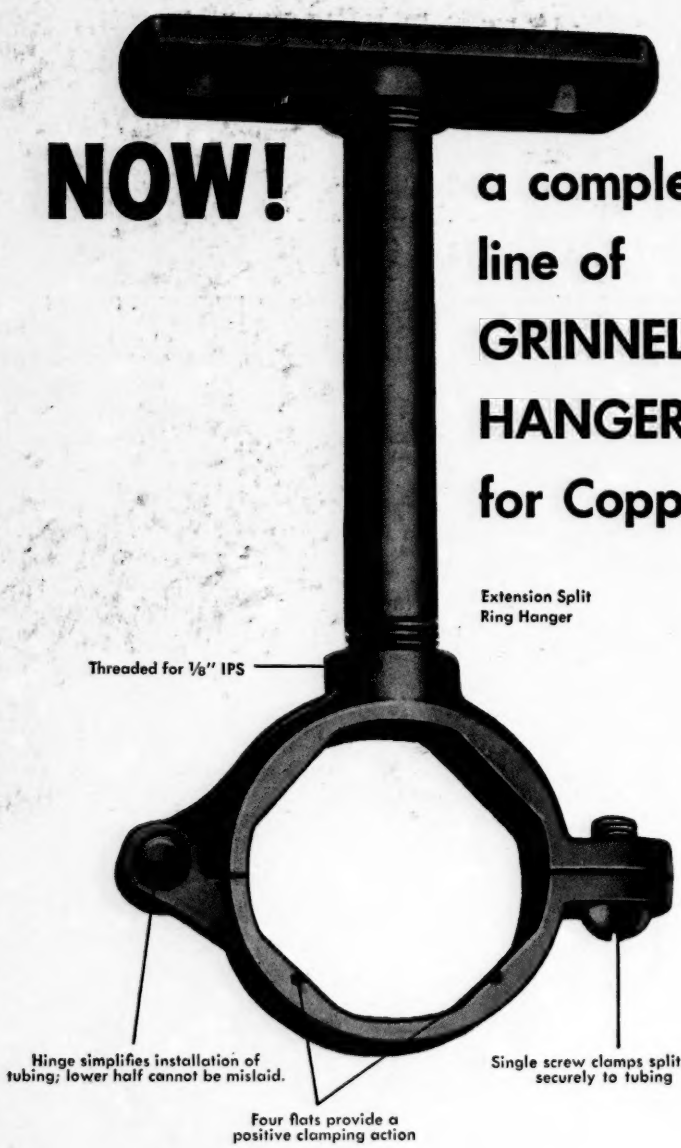
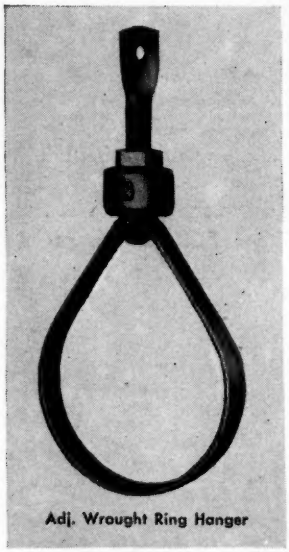
NOW! a complete line of GRINNELL HANGERS for Copper Tubing



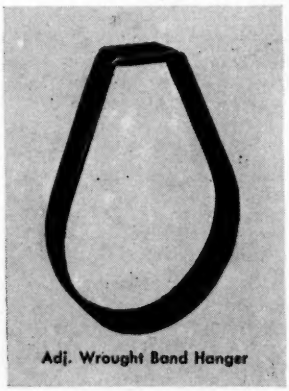
Adj. Wrought Clevis Hanger with Threaded Rod and C-Clamp


Extension Split Ring Hanger
Threaded for 1/8" IPS
Hinge simplifies installation of tubing; lower half cannot be mislaid.
Four flats provide a positive clamping action
Single screw clamps split ring securely to tubing



Adj. Wrought Ring Hanger

Split-Ring with Socket and Coach Screw



Adj. Wrought Band Hanger

Grinnell now offers, in one *complete* line, every standard type of hanger and support for copper tubing. All are heavily copper plated for long, rugged wear. All are accurately sized to fit standard copper tubing, and designed to give a neater installation wherever copper tubing is used.

For dependability, speed, and convenience . . . let Grinnell's coast-to-coast network of warehouses and jobbers serve you as a one-stop source for all your copper tubing hanger requirements. Grinnell-trained personnel are ready to work with you "on-the-job", anywhere, to help solve any problem connected with hangers and supports for copper tubing.

Whether it be for copper tubing or standard pipe, specify Grinnell hangers. No other company makes as complete a line; provides as thorough a distribution service; or can cooperate as fully on *all* your piping assignments.

Write for your copy of the COPPER TUBING HANGER Catalog. Grinnell Company, Inc., 218 West Exchange St., Providence, Rhode Island.

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pipe and tube fittings • welding fittings • engineered pipe hangers and supports • Thermolier unit heaters • valves
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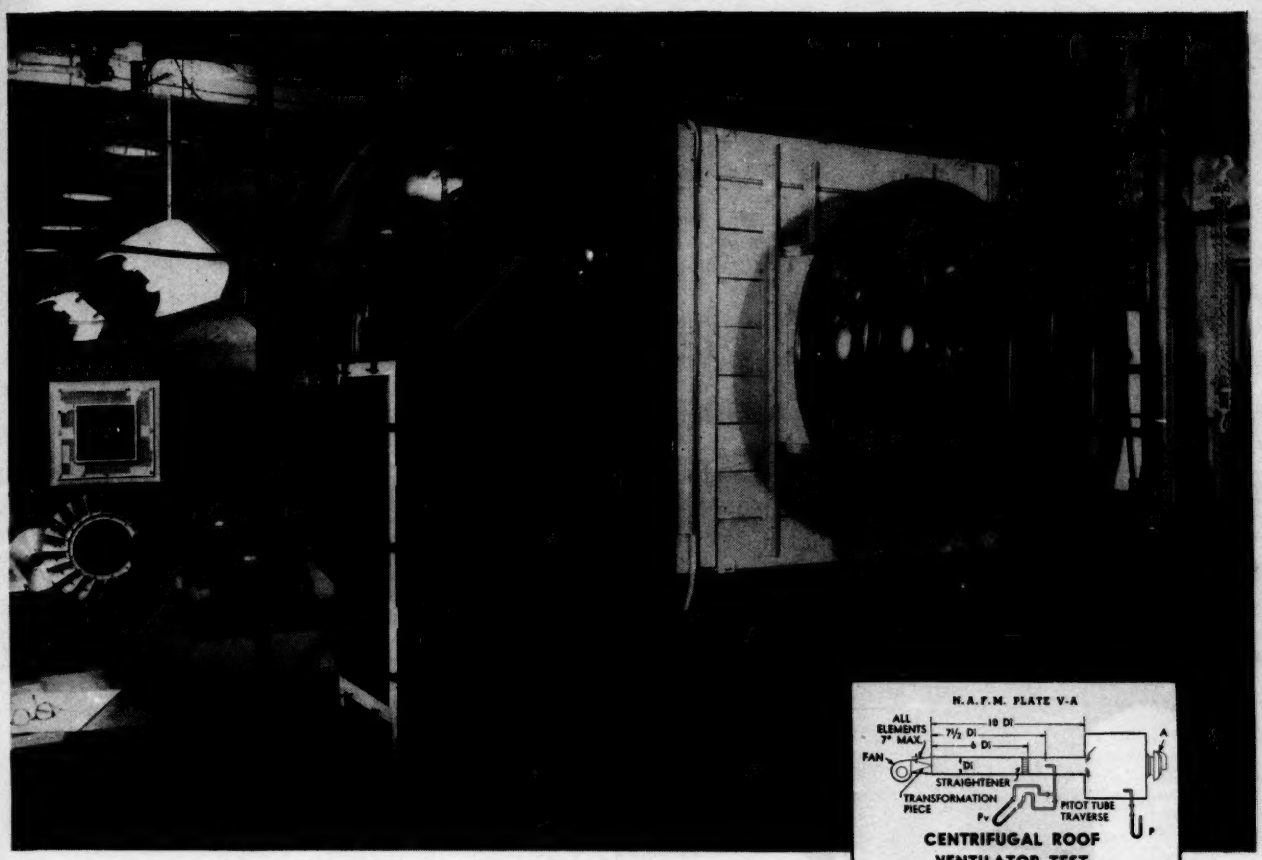

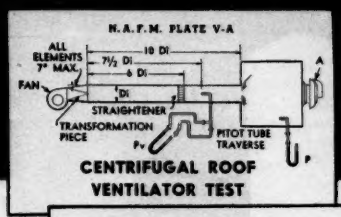

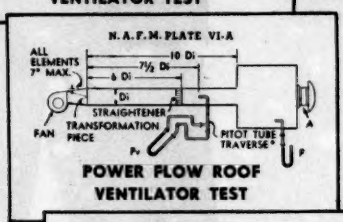

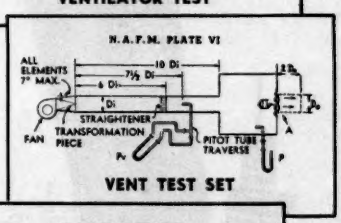

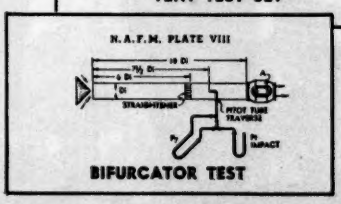

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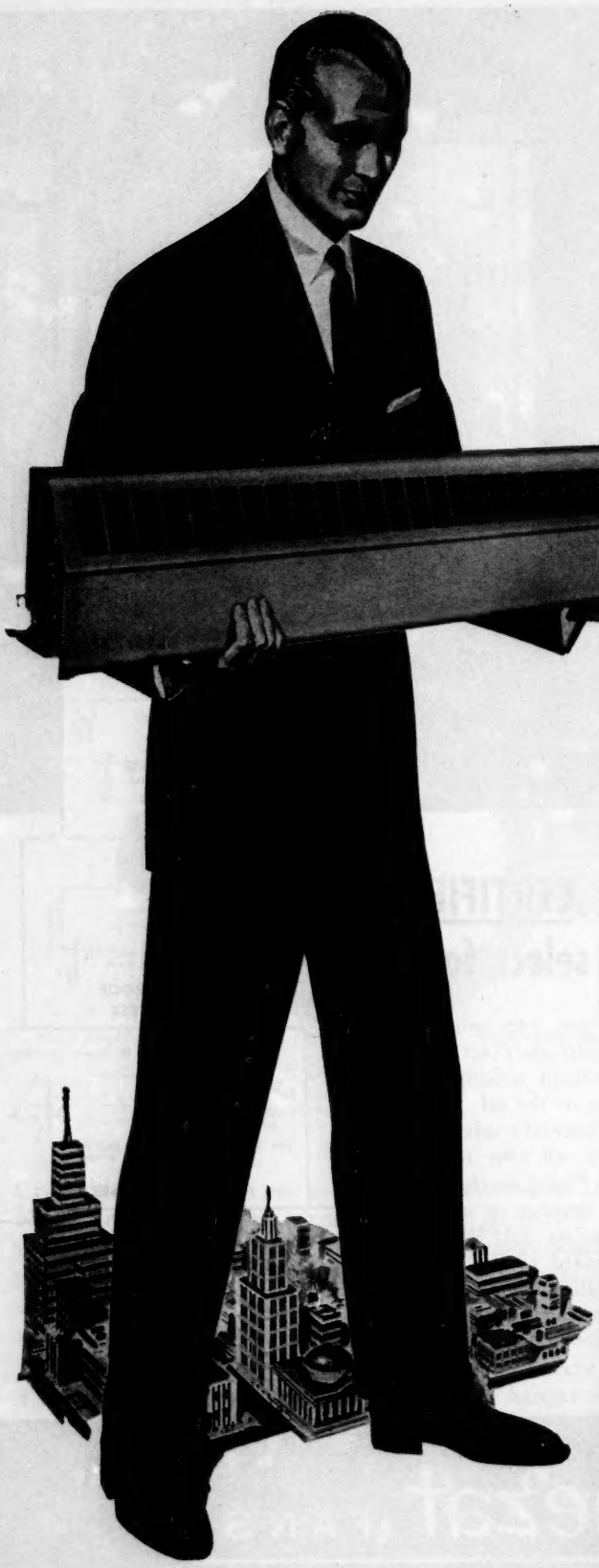

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Yes, Webster Walvector . . . in the hands of your Warren Webster Man . . . is what you need for winter-long heating comfort, in commercial, industrial or institutional buildings . . . anywhere. Webster Walvector blankets every exposed wall with a barrier of clean, uniform, draft-free warmth that keeps winter out, keeps comfort in.

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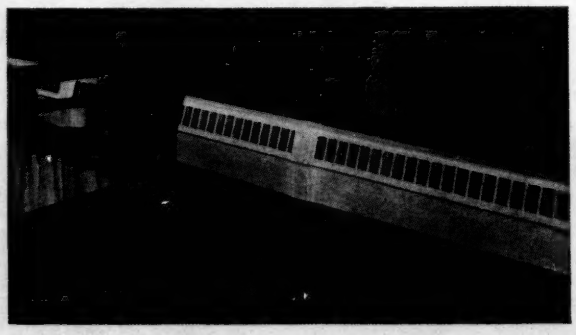

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HEATING . . . COOLING

AIR CONDITIONING HEATING AND VENTILATING

MARCH, 1957

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The Cover: Binks Mfg. Co. cooling tower atop Chicago's Palmer House roof handles 8000 gpm for system cooling 1735 rooms. Tower saved 96% of water bill.

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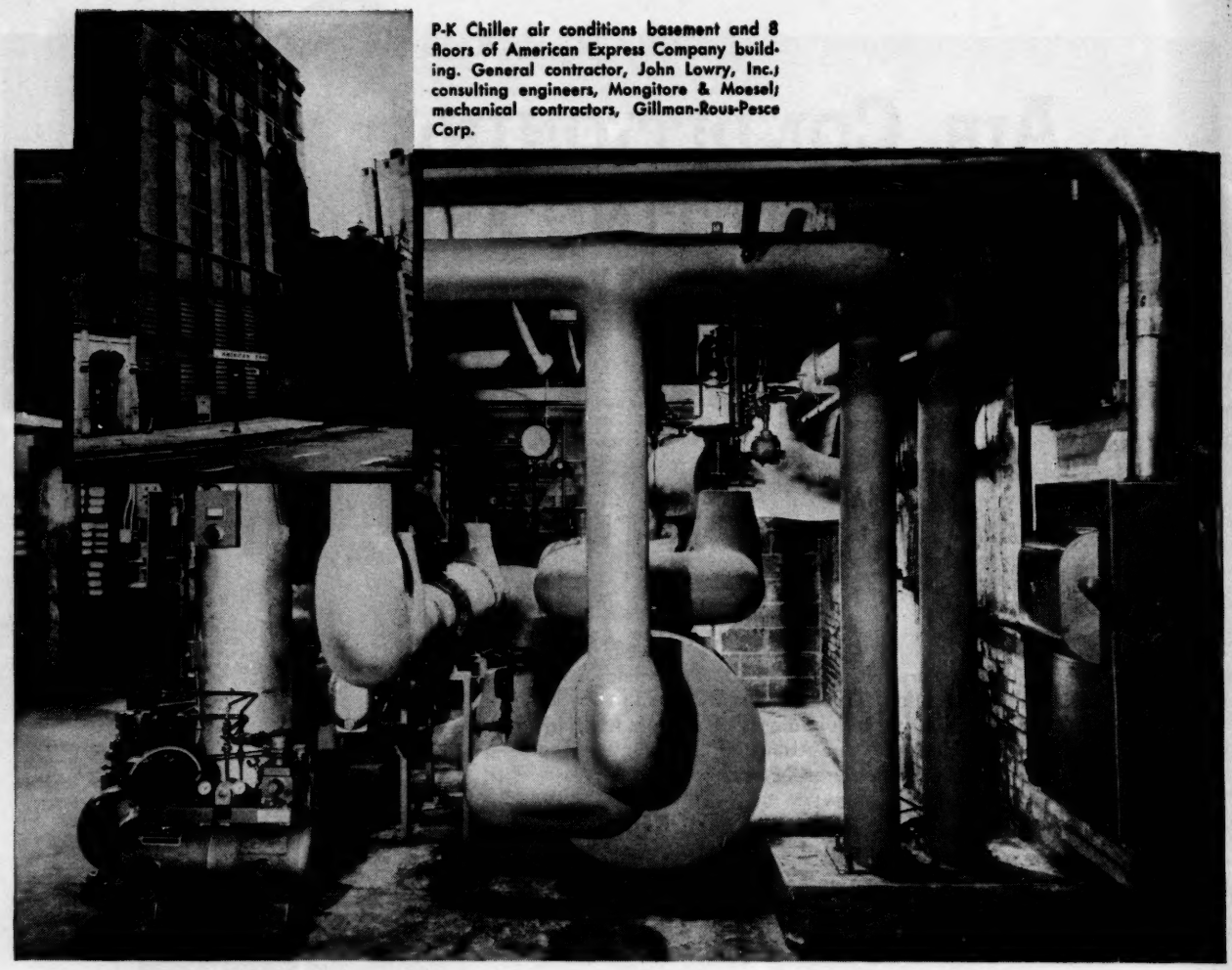

P-K Chiller air conditions basement and 8 floors of American Express Company building. General contractor, John Lowry, Inc.; consulting engineers, Mongitore & Moesel; mechanical contractors, Gillman-Rous-Pesce Corp.

P-K Chiller uses piped-in brine to air condition American Express

American Express Company processes money orders and travelers cheques from all over the world in a downtown Manhattan building, erected in 1858. Years ago, pipes were laid underground from a refrigerating plant, three blocks away, serving cold storage warehouses. Today, these same 6" mains feed primary brine, at about 0°F, to a P-K Chiller for an air conditioning system.

In this unusual air conditioning installation, the P-K Chiller cools secondary brine to 38°F, at a maximum load of 300 tons. It serves the basement and 8 floors of the building, and can be expanded to serve two floors now used for storage files.

The P-K Chiller's use of piped-in brine saved $100,000 in refrigerating plant equipment, occupies only 15' x 20' of space. Operating and maintenance costs are low. American Express also uses a P-K heat exchanger to temper the air supply for the building during the winter.

The efficiency of P-K Chillers was a major factor in P-K's selection for this installation. But P-K has the engineering answers to any air conditioning or heat transfer problem you may have. For complete information about P-K Chillers, write today for Catalog 101. The Patterson-Kelley Co., Inc., 930 Burson Street, East Stroudsburg, Pa.

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5870

Flooded and Dry Expansion Type Freon Coolers and Storage Water Coolers • Freon Condensers • Allied Refrigeration and Air Conditioning Equipment

HIGH SPOTS

• The **National Bureau of Standards,** Washington, D.C., is planning to spend $60,000,000 in the next five years to move from its outmoded 60-building plant to Gaithersville, Md. **Voorhees Walker Smith & Smith** of New York is conducting preliminary studies. Among the exacting requirements of the new structure are very close control of humidity and temperature. No vibration can be tolerated. The optics division wants a ten-mile sighting range.

• **Cryotrons,** very much smaller than transistors, may replace both the vacuum tube and the transistor in electronic computers. Consisting of two minute wires, one straight, the other wound about it, they **operate below —455.4 deg F.** Straight wire is superconductive at that temperature until current in the coiled piece produces an electromagnetic field which cuts off its current. Many switching circuits are possible by interconnecting families of these single switches. Liquid helium is the refrigerant. Cryotron was developed by Massachusetts Institute of Technology instructor **Dudley A. Buck** in collaboration with MIT's Lincoln Laboratory.

• A **$550,000 initial program** aimed at eliminating air pollution in New York State was recommended by Governor Harriman in a special message to the legislature. The appropriation would include $300,000 for a **health and engineering research program** by the State Health Department, and $250,000 to permit the department to **provide technical services** to communities throughout the state. The governor proposed the creation of an Air Pollution Control Board in the department, but urged a two-year delay in the exercise of regulatory powers by the board.

• Marcel A. Cordovi, head of materials and testing department of The Babcock & Wilcox Company's Atomic Energy Div., has been selected as a principal lecturer for a course on **metallurgy of nuclear power reactor materials** slated for the spring semester at the Polytechnic Institute of Brooklyn. School officials stated that the course, offered for the first time in the East, has been developed as a contribution to **President Eisenhower's Atoms for Peace program.**

• Half a century as the nation's air sentinel will be celebrated by the **Air Pollution Control Association** from June 2-6, 1957, at its **Golden Jubilee meeting** in St. Louis, Mo. President Benjamin Linsky, administrative control officer of the San Francisco Bay Area Pollution Control District, will keynote the fifty-year observance.

• The **Fourth Annual Conference for Engineers and Architects,** sponsored by the College of Engineering at Ohio State University, is scheduled for Friday, May 3, 1957, on the Ohio State campus. The conference is expected to attract about 1000 engineers and architects from all over the country, surpassing last year's attendance of more than 800 from 21 states.

• **Engineers and maintenance personnel** responsible for all phases of design, operation and maintenance of refrigeration, air conditioning, and cold storage facilities at U.S. Air Force and Army bases in the Orient will attend a **six-day conference** sponsored by Headquarters, Pacific Air Force and Far East Air Forces, on April 10-18, 1957. It will be similar in nature to the one at Ashiya Air Base, Japan, and the worldwide Air Force conference at Maxwell Air Force Base last year.

• **Ira Emmett McCabe, 62,** nationally known for his inventions in the field of automatic controls, died February 13 in Miami, Fla., where he became ill while vacationing. He was board chairman and chief engineer of Mercoid Corp., Chicago.

WASHINGTON OVERTONES

by LORING OVERMAN

How to reconcile **proposed increased Government spending** with threats of inflation?

- What about wage-price controls as an **inflation brake?**
- When and whether to **ease mortgage credit?**

These—together with other politically-loaded problems of veterans, labor, schools-and-civil-rights, and runaway petroleum prices—were among the more audible overtones during recent weeks in Washington.

There was talk in Capitol circles of a **"new Republicanism"**, and much speculation as to its true meaning. Concensus was that those who favor increased Government spending as the surest road to political perpetuation were in the ascendency.

Speculation has it that between now and the next Congressional elections, their strategy will be to win over as many doubtful areas as possible. This hint of increased Federal spending fails to square with Administration **warnings to labor** that greater productivity must precede any further wage increases; **warnings to business** that price rises may spawn dangerous inflation.

● **Wage and price controls** have been mentioned publicly as a possible move if inflationary moves continue. Political considerations, however, render such controls most unlikely. Exception: a real national emergency. More likely deterrents are continued tight money; possibly study of consumer credit limits.

● **Of greatest concern** to air-conditioning, heating, ventilating industries are movements affecting construction—commercial, industrial, home, Federal. Approaches vary with individual viewpoints; pocketbooks.

● **One step** to ease the inflationary impact of Federally-financed construction was taken in mid-February by General Services Administration. GSA announced **temporary suspension** of efforts to construct Federal buildings under lease-purchase programs.

Action was explained as in line with the President's budget message policy of postponing all work which can be deferred, with exception of construction to meet urgent needs of schools, highways and housing. Purpose of action: to lessen competition for labor, materials and equipment.

● **Typical reaction** to this effort to economize on expenditures of money, men and materials was legislation introduced on the day of the foregoing announcement by Rep. Robert E. Jones (D-Ala.). His proposal would **scuttle the lease-purchase program;** substitute a five-year $1.5 billion direct appropriation plan to start at once on the 140-odd projects authorized under lease-purchase.

Only one of the projects contemplated under the program is under way—a $2 million Post Office and Court House at Rock Island, Ill.

Pros and cons of mortgage credit for housing are to be discussed at public hearings before the House Banking subcommittee, starting March 4. To be discussed:

● H.J. Res. 209 would give the Federal National Mortgage Association $500 million additional borrowing authority. The association, familiarly known as Fannie May, provides a secondary mortgage market for veterans' loans. HJRes 209 would give Fannie May only half of the President's request for $1 billion.

Some legislators propose virtually unlimited funds for Fannie May.

● $200 million more for direct loans to veterans for housing are proposed in legislation introduced by Chairman Teague (D. Tex.) of the House Veterans Affairs Committee, and Rep. Ayres (Ohio) senior Republican on the committee.

The increase, if granted, would give VA about $500 million for direct loans. Bills would also raise maximum direct loan to $12,500 from $10,000. The Ayres measure, however, would increase the interest rate on GI loans to 5 percent, as proposed by the Administration.

● Spokesmen for veterans' organizations, speaking before the House Veterans Affairs Committee, urged that GI and FHA loan rates be equalized, both to be competitive with conventional loans. Although preferring that the FHA 5% rate be rolled back to the GI 4½% level, an American Legion spokesman said his

(Concluded on page 8)

These are important problems! DO YOU KNOW THE ANSWERS?

1. **Does BRONZE or ALUMINUM paint on an IRON radiator improve or impair its performance?** (19, 20, 22)

2. **Will ORDINARY paint on an IRON radiator improve or impair its performance?** (19, 20, 22)

3. **Is it true that ICE radiates heat at a greater rate than a stove?** (17, 18, 22)

4. **What is :- *k* factor? C factor? Btu? U factor? R factor?** (17)

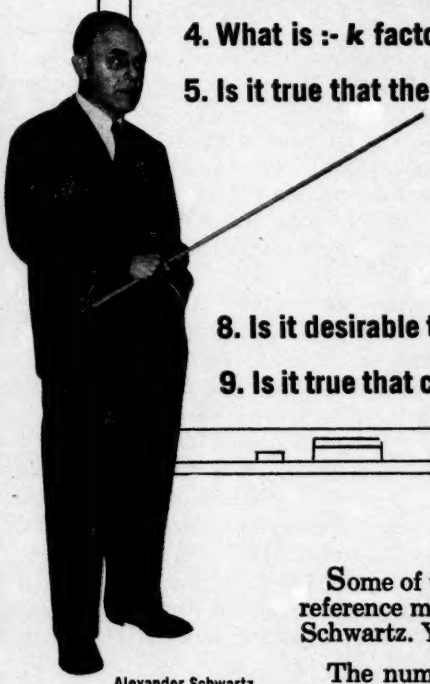
5. **Is it true that the loss of each lb. of vapor represents a heat loss of 1060 Btu's, or TEN TIMES that which raises the temperature of 1 lb. of water 100°F?** (5)

6. **Does insulation KEEP OUT THE COLD?** (17, 3)

7. **Do thermal insulations create heat?** (3)

8. **Is it desirable to place vapor barriers on both sides of an insulation?** (5)

9. **Is it true that cold does not flow to warm, but heat to cold?** (17, 18, 19)



Alexander Schwartz, writer and lecturer on heat flow, vapor flow, and condensation.

Some of the answers may surprise you! Look them up in a handy, *new* reference manual, "Heat Flow by Radiation in Buildings," by Alexander Schwartz. You may obtain the booklet *free!*

The numbers above refer to pages in this *important contribution* on the theory and practice of insulating against heat and vapor flow, and against destructive condensation. It is replete with simple, illustrated explanations of how to solve many usual and unusual heat flow and fuel problems; also illustrates many new installation techniques.

The author is a well-known lecturer in the field of heat and vapor flow, and thermal insulation. He is president of Infra Insulation, Inc. and author of "Simplified Physics of Vapor and Thermal Insulation," which has been used for years as a text in universities, technological institutes and colleges, and as a valuable reference by architects, engineers, and builders.

In this one handy booklet of 48 pages are assembled and presented in clear, concise, easy-to-follow language: —facts; figures; reports of practical experiments and scientific theories obtainable otherwise only through years of study and consultation of hundreds of books and other publications. It is generously illustrated with drawings, photographs, diagrams, charts.

"Heat Flow by Radiation in Buildings" is yours, FREE, for the asking —Just use the coupon, and get the "answers"!

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ADDRESS _____

WASHINGTON OVERTONES (*Concluded from page 6*)

group would back legislation giving VA authority possessed by FHA to adjust rates as needed.

Veterans of Foreign Wars suggested, instead of proposed ½% boost in GI rates, "a tax-exemption of 2½ or 3% of the interest yield". Such tax-exemption, he said, would not encourage inflation but might encourage investment in GI loans.

Appearing at the same hearing, Budget Director Percival Brundage favored increasing the GI rate to 5% from 4½%, and opposed proposals to increase amounts available for direct loans on GI housing.

● **Fantastic** in its application to the air-conditioning, heating and ventilating industries is word that the Administration "is giving serious consideration to a gigantic program of building **civil defense shelters"** to cost between $20 billion and $40 billion.

The Holifield Subcommittee of the House Government Operations Committee heard the story on February 13 from Assistant Budget Director Robert E. Merriam.

On the following day the subcommittee heard a second proposal—suggesting a $7.25 billion program to put civil defense "in a reasonably strong position in a period not exceeding five years." Author of the proposal was Dr. Edward Teller, Director, U. of California Radiation Laboratory.

Dr. Teller talked of deep underground shelters in congested areas to hold upward of 1000 persons. He suggested that subways could be modified, and that shelter areas could be constructed in new buildings.

Also speaking on behalf of the shelter program, Col. Richard F. Lynch, president of the U. S. Civil Defense Council, conceded that while shelters would cost billions, it would be a cheap price to pay for saving millions of lives.

● Meanwhile, looking at the current construction front, **private housing** dipped to 62,250 starts in January, 1,400 below December. Including public housing's 2,500 units, the total for January was 1,000 above December's total for **all** types. January figure was at the seasonally adjusted rate of 1,010,000 units, according to Bureau of Labor statistics.

● Progress of the $2.2 billion federal aid school construction program has important overtones for those who heat, air-condition, and write water and drainage specifications.

Welfare Secretary Marion B. Folsom urges prompt action on the program for these reasons:

". . . a continuing, substantial and widespread **shortage of public school classrooms,** born of depression and war, and aggravated by the greatest enrollment increase in our history.

". . . unless financially needy communities get help the classroom shortage will persist for many years, hampering the education of our children and limiting the progress of our country."

The Secretary added: "I would much prefer to see the states and communities solve this problem, but we are confronted with a situation, not a theory."

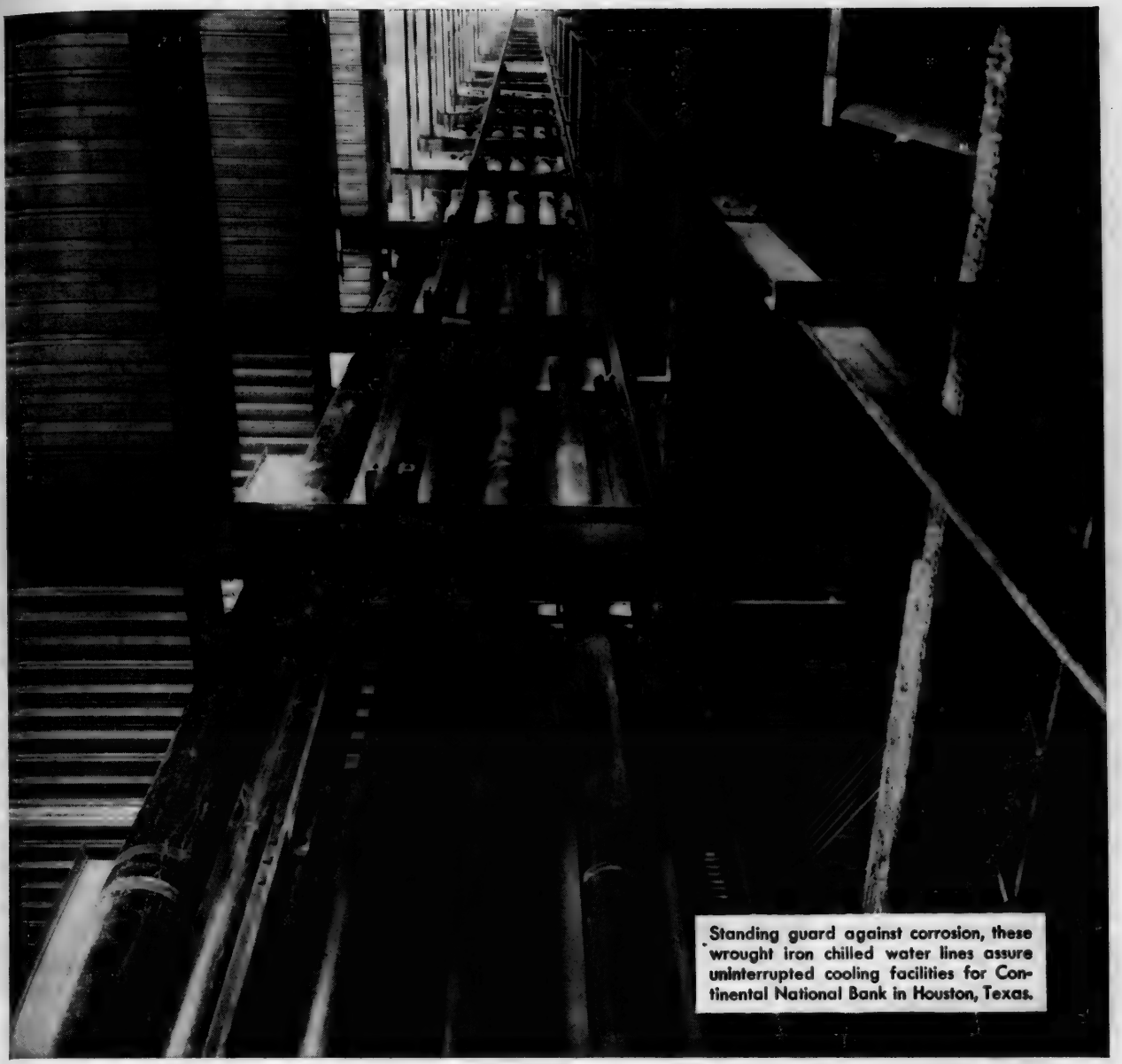
● Political strategists favoring the school bill hope first to pass civil rights legislation, lest fillibusters stymie passage of the educational measure.

● What "federal aid to education" means to 16 of the nation's more prosperous states and the District of Columbia is summarized by the U. S. Chamber of Commerce in an analysis of tax contributions to be made to the proposed $325 million annual fund. The **16 states** and D.C. **would receive $100,000,000 less** than they would pay into the fund, the difference going to pay for schools in other states.

The 16 states, listed in order of their net contributions: New York, California, Illinois, Ohio, New Jersey, Michigan, Connecticut, Massachusetts, Pennsylvania, Maryland, Missouri, Delaware, District of Columbia, Rhode Island, Colorado, Washington, and Nevada.

● National population reached 170,000,000 on Friday, February 15.

● A four-fold **boost in electric power production** within 20 years was forecast in Washington in mid-February during the city's Electrical Trade Conference in observance of National Electrical Week. During same period, the electrical manufacturing industry may be expected to increase its sales 4½ times, it was said.



Standing guard against corrosion, these wrought iron chilled water lines assure uninterrupted cooling facilities for Continental National Bank in Houston, Texas.

Air Conditioning with Wrought Iron Pipe saves premature maintenance and replacement costs

Wrought iron pipe's ability to last a long, long time in air-conditioning service can save the cost of emergency repairs usually associated with less durable piping materials.

This resistance to corrosive attack stems from the thousands of iron silicate fibers which make up wrought iron's structure. These glasslike, non-rusting fibers prevent pitting and rapid penetration.

We have case history evidence of wrought iron pipe's reliability in carrying corrosive brines and waters. Our booklet, *Wrought Iron in Refrigeration and Air Conditioning Systems,* gives the details. Write for a copy.

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Available in Canada and throughout the world

BYERS Wrought Iron Tubular and Hot Rolled Products

ALSO ELECTRIC FURNACE QUALITY STEEL PRODUCTS

BRIEFLY STATED

• The American Institute of Consulting Engineers has announced the election of **Edward H. Anson,** of New York, as president, succeeding **Carlton S. Proctor,** of New York. Mr. Anson is senior vice president and director of Gibbs & Hill, Inc., New York, N. Y.

• **Albert L. Hollinger,** vice president of Surface Combustion Corp., Toledo, Ohio, has been appointed vice president in charge of sales of all industrial divisions of the corporation. Mr. Hollinger has been sales manager of the Steel Mill Division since 1930.

• The Sturtevant Division of Westinghouse Electric Corp., announced appointment of **Neal T. O'Rourke & Associates** of Buffalo, N. Y., as representatives for the company's line of commercial and industrial equipment.

• A training school to teach proper handling of the company's powder-actuated fastening tools is being started by **Ramset Fastening System,** a part of Olin Mathieson Chemical Corp. The school, offering the first formal course given in the industry, had its first session on January 28th. Each course will last for three days and new classes will start every other week at the company's headquarters in Cleveland where a special training room has been built.

• Announcement was made by **National-U. S. Radiator Corp.,** of their proposed new Research Park Engineering Center at Johnstown, Pa. The company plans to devote the Center to research and development work on home and industrial space heating and air conditioning in addition to heat exchanger equipment and boiler testing.

• **Thomas D. Bromley** has been elected president of the Dura-Vent Corporation of Redwood City, Calif. For the last 10 years, Mr. Bromley has been vice-president in charge of sales of the Peerless Manufacturing Corp., Louisville, Ky., which position he continues to hold.

• John A. Robertshaw, president of **Robertshaw-Fulton Controls Co.,** announced that an agreement has been reached whereby the company will acquire all of the assets and business of **Acro Manufacturing Co.,** Columbus, Ohio. Acro will become a division of Robertshaw-Fulton, and its operations will be continued with its present management and staff.

• **Associated Thermal Products, Inc.,** New York City, has been named sales representative for **Modine Manufacturing Company's** heating and air conditioning products in the New York territory.

• **W. T. Halket** has been named general sales manager of water heating products and **J. W. Burleson** is now general sales manager of heating and air conditioning products for Permaglas Div., A. O. Smith Corp., Kankakee, Ill.

• **Recold Corporation** became the new name of Refrigeration Engineering, Inc., Los Angeles, on February 15. Company officials felt the name change was inevitable since the firm has been known unofficially as Recold since 1932 and has marketed its products under that trademark since that time.

• **R. W. Olsen** has been named manager of commercial engineering for Home Heating & Cooling Dept., General Electric Co., Bloomfield, N. J. Mr. Olsen is headquartered at the department's new plant in Tyler, Texas.

• The purchase of **Campbell Controls Co.,** Santa Ana, Calif. has been announced by officials of **Penn Controls, Inc.,** Goshen, Ind. Increased product diversification and the expansion of existing product lines were listed as primary reasons for the acquisition. The California firm will continue operation as a division of the purchasing company.

• **Airtherm Mfg. Co.,** St. Louis, Mo., announces the appointment of Kenneth B. Little Co., Cincinnati, Ohio, and Robar, Inc., St. Paul, Minn., to handle their line of heaters, air conditioners, and convectors.

• **J. Frederic Byers, Jr.,** former president of A. M. Byers Co., Pittsburgh, Pa., and a director since 1939, at a meeting of the board of directors was elected chairman of the board. At the same time, **B. M. Byers,** also a director, was elected president of the company to succeed his brother.

• **J. W. Gerrard** has been appointed St. Louis branch manager of the Commercial Division of York Corporation, Subsidiary of Borg-Warner Corporation.

• Field Control Div., H. D. Conkey & Co., Mendota, Ill., has announced the appointment of **William D. Bogh** to represent its barometric draft control line in southern California.

• **John W. Arnold** has been appointed Pittsburgh branch manager for National-U.S. Radiator Corporation. Mr. Arnold succeeds **Cecil T. Hale,** who is retiring, as branch manager.

• **John W. See** was appointed regional sales manager of the Tuthill Pump Co., Chicago, Ill. Mr. See will have charge of the company's sales organization in New England, New York, New Jersey, and the eastern half of Pennsylvania.

• Whitman, Requardt and Associates, consulting engineer firm of Baltimore, Md., announces that **Raymond C. Regnier** and **Henry A. Naylor, Jr.,** have been taken into partnership. Both with the firm for over 15 years, Mr. Regnier will continue to devote himself to civil engineering and Mr. Naylor to mechanical and electrical engineering projects. In addition, **Roland A. Clark, Charles F. Millard, Roger T. Powers,** and **Nevin S. Weiss** have been appointed associate engineers.

(*Concluded on page* 12)

And on the USS Saratoga— A FUTURE OF FAULTLESS SERVICE

Official U. S. Navy photos

Largest and most powerful vessel ever built is the U.S.S. Saratoga, sixth man-of-war to bear that fighting name. With masts hinged to clear the Brooklyn Bridge, with a beam too broad for the Panama Canal, this recently completed super supercarrier . . . outfitted with nearly 500 DELANY diaphragm type flush valves . . . stresses air conditioned habitability for her crew of 446 officers and 3,360 men. Extending 1,039 feet in length and displacing over 60,000 tons, the Saratoga will handle her planes on six acres of flight and hangar deck. Appropriately, DELANY valves . . . designed for the rigors of salt water flushing . . . were selected for this triumph of marine engineering. At many future ports of call, DELANY valves will also be found in extensive use ashore, for unmatched construction and performance has made DELANY — "the fastest growing name in flush valves."

This new "HAND BOOK and CATALOG No. 53" is the most comprehensive of its kind—designed for everyday reference . . . 19 pages of installation details for exposed, concealed and special FLUSH VALVE installations . . . over 75 blue prints . . . cut away views . . . many pages of charts, formulae, piping details . . . sent free, if requested on firm letterhead.

COYNE & DELANY CO. • 834 KENT AVE. • BROOKLYN, NEW YORK
IN CANADA: THE JAMES ROBERTSON CO., LTD.

DELANY *Flush* VALVES

Since 1879

BRIEFLY STATED

(*Concluded from page* 10)

• Keystone Brass Works, Erie, Pa., manufacturer of copper tube fittings and valves, announces appointment of **George Dublin** as sales manager of its Brass Division.

• **Crawford Robertson** has been appointed New York district manager for Connor Engineering Corp., Danbury, Conn.

• **Stan Fremmel** has been appointed district sales manager of all products for the St. Louis office of General Air Conditioning Corp., Los Angeles, Calif. He most recently was a sales engineer with Harry Kaiser Co., Chicago, Ill.

• A dozen eastern area gas company representatives attended a full day series of meetings held in Reading, Pa., by **Orr & Sembower, Inc.** Demonstrations of the manufacture and testing of gas-fired boilers, a tour through the company's plant and Service School, and round-table discussions were held. Sales of boilers built to burn gas now account for about half of the firm's packaged boiler sales, William B. Firman, sales manager, said.

• Machinery and Systems Div., **Carrier Corp.,** Syracuse, N. Y., will move into its laboratory for the design and testing of central systems for large structures, in July. An environmental sound test room will have a movable ceiling and be large enough for erection of a suite of offices inside. Isolated from the main building, and floating on spun glass, will be another sound room with reversible walls for either soft or hard sound testing.

• **Dr. Zay Jeffries,** noted metals scientist and retired vice president of the General Electric Company, has been re-elected chairman of the board of trustees of **Battelle Memorial Institute,** Columbus. In addition to election of officers, the board authorized purchase of additional land near the Battelle nuclear research center, planned extension of an educational program set up for staff members, and acted to broaden the management responsibilities of institute officers.

• All training and educational work for the Bell & Gossett Co., Morton Grove, Ill., will now operate under the immediate direction of **William G. Carlisle,** named training and education manager.

• Corporate name of the Northern Indiana Brass Co., Elkhart, Ind., became **Nibco Inc.,** in January of this year. The firm, a manufacturer of valves and fittings for copper plumbing, has used the term Nibco for many years as a trademark to identify its products.

• **C. S. Barbara,** long associated in the swimming pool equipment field, has been added to the sales staff of representatives for Laars Engineers, North Hollywood, Calif.

• 22 graduate engineers from colleges and universities in the U.S. and Canada have completed an intensive sales engineering training program at **The Trane Co.,** La Crosse, Wis. The course helps prepare the men for their new industrial positions by giving them specialized training on practical applications of engineering. 15 of the men have been assigned to the company's U.S. sales offices and the remainder will join the firm's Canadian sales operation.

• The Board of Directors of the Air Moving and Conditioning Association, Inc., announced the names of officers elected for 1957. Elected president is **W. H. Rietz,** president of Ilg Electric Ventilating Co., Chicago. Mr. Rietz also serves as a director of the association. **R. W. Nelson,** vice-president of American Air Filter Co., Louisville, has been elected vice-president. Also named vice-president is **F. W. McKenna,** chief engineer of the Kennard Corp., St. Louis. **J. P. Johnson,** sales manager, Ventilating Div., The Swartwout Co., Cleveland, has been elected secretary-treasurer. Reappointed as executive vice-president is **L. O. Monroe,** who will administer association activities.

• **Russell E. Keller** has been appointed sales manager of industrial air conditioning for Betz Div., Bohn Aluminum & Brass Corp., Detroit, Mich. As such, Mr. Keller will direct activity in a complete new line of self-contained air conditioning equipment for industrial installation. **Robert W. Carvell** has been recalled from the field and appointed sales manager of commercial sales. He will cover all wholesaler activities and supervise advertising and sales promotion.

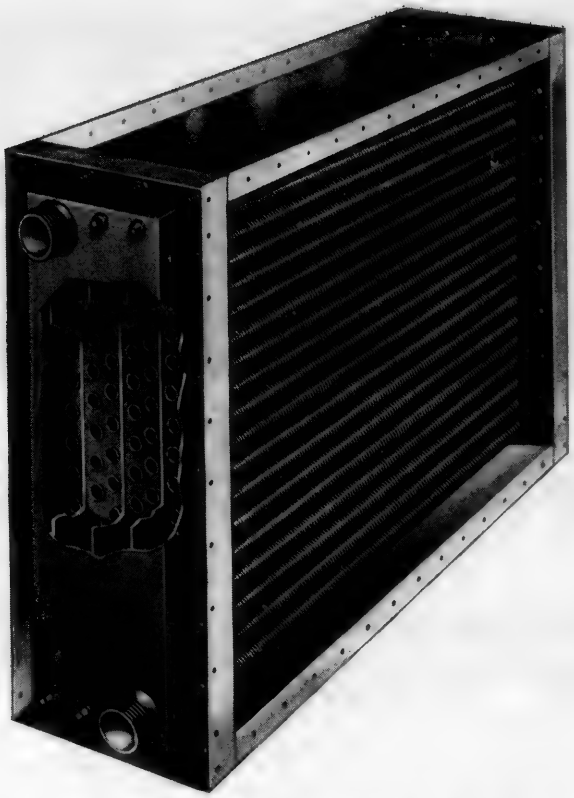
• The advancement of **William N. Pauley** to partnership in the firm of H. E. Bovay, Jr., Consulting Engineers, has been announced. Mr. Pauley has had charge of the Spokane, Wash., branch office of the firm, and will continue in that capacity as a partner.

• **Kenneth S. Brundige** has been appointed manager of the condenser department of Foster Wheeler Corp., New York, N. Y. Mr. Brundige joined the company in 1937. He was formerly assistant professor of engineering at Clarkson College, Potsdam, N. Y.

• **Sylvan R. Hirsch,** formerly manager of engineering at Worthington Corporation's Holyoke Div., has been appointed assistant to the vice president-engineering with headquarters at the corporation's Harrison Div. **Frederick B. Seel** succeeds Mr. Hirsch as manager of engineering at the Holyoke Div.

• Marsh Heating Equipment Co., Skokie, Ill., through James Emmett, Jr., vice president, recently announced the appointment of **F. O. Pauls** as advertising manager.

• **Gustave H. Kuechler,** manager of licenses and associated companies for Combustion Engineering, Inc., died recently at his office in New York City. He was a member of ASME and the Advertising Club of New York, and was a registered professional engineer in the state of New York.



AEROFIN TYPE R REMOVABLE-HEADER WATER COILS

• Complete Drainability
• Easily Cleaned
• High Heat Transfer

Completely drainable and easily cleaned, Aerofin Type "R" coils are specially designed for installations where frequent mechanical cleaning of the inside of the tubes is required.

The use of ⅝" O. D. tubes permits the coil to drain completely through the water and drain connections and, in installations where sediment is a problem, the coil can be pitched in either direction. The simple removal of a single gasketed plate at each end of the coil exposes every tube, and makes thorough cleaning possible from either end.

The finned tubes are staggered in the direction of air flow, resulting in maximum heat transfer. Casings are standardized for easy installation.

Write for Bulletin No. R-50.

AEROFIN CORPORATION

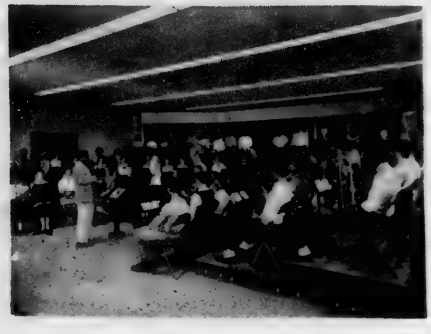
101 Greenway Ave., Syracuse 3, N. Y.

Aerofin is sold only by manufacturers of fan system apparatus. List on request.

Thermal comfort, convenience, economy in largest

ABINGTON TOWNSHIP SENIOR HIGH SCHOOL, Abington, Pennsylvania . . . is noteworthy for its comprehensive educational program and its complete development of modern facilities for learning.

Architect:
Joseph Wigmore, Philadelphia, Pa.
Mechanical Engineer:
Carl D. Shields
General Contractor:
Baton Construction Corporation
Mechanical Contractor:
American Sanitary Sales & Service Co., Inc.



"This school has been built by the careful work of
loves of many hearts, the
clear lights of many minds.
We pray that it may be for-
ever free to hand down to
our children the heritage
under God which we have
treasured from our fore-
fathers."

high school in suburban Philadelphia, are assured

by a POWERS THERMOSTATIC control system

POWERS Individual Room Control regulates heating and ventilating in the buildings shown above which have over 250,000 sq. ft. of floor space.

Control of the steam heating system is divided into 16 functional zones, each with its own DAY-NITE-quick warm up selector switch. Static pressure control of air in main auditorium and stage area prevents stage curtain from blowing. Controls in main auditorium and Audion also provide for future air conditioning. Other types of Powers control regulate steam pressure of oil fired boilers, temperature of feed water heaters, fuel oil preheaters, domestic water heaters and swimming pool heater.

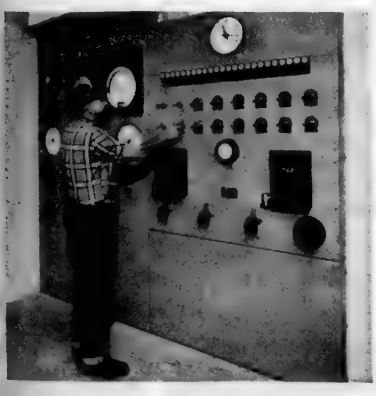
(C82)

Abington's new $6,000,000 high school has been designed to provide the most effective environment for stimulating learning and all around growth of students and adults of the community.

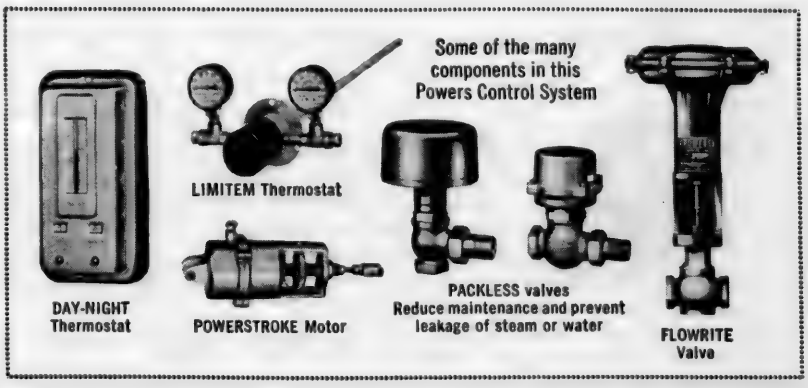
In each of 150 classrooms and special service rooms, heating and ventilating are controlled by a Powers individual room thermostat. Ideal room temperatures help students to think better and increase efficiency of teachers. By eliminating over-heated rooms Powers control also reduces heating costs.

Powers Control Systems are engineered to give lowest operating and maintenance cost service. Users often report 25 to 40 years of dependable control with a minimum of repairs.

Are You Planning a New Building or remodeling an old one? Ask your architect to include a Powers quality system of temperature control. You will help insure utmost comfort, fuel economy and lowest operating and upkeep cost.



Powers Master Control Panel in engineer's office provides centralized supervision for the 16 zones throughout the school plant. When gymnasium or swimming pool are in use, heating and ventilating in locker spaces automatically go into operation. Special Powers humidity control prevents "fogging" of large glass window in swimming pool.

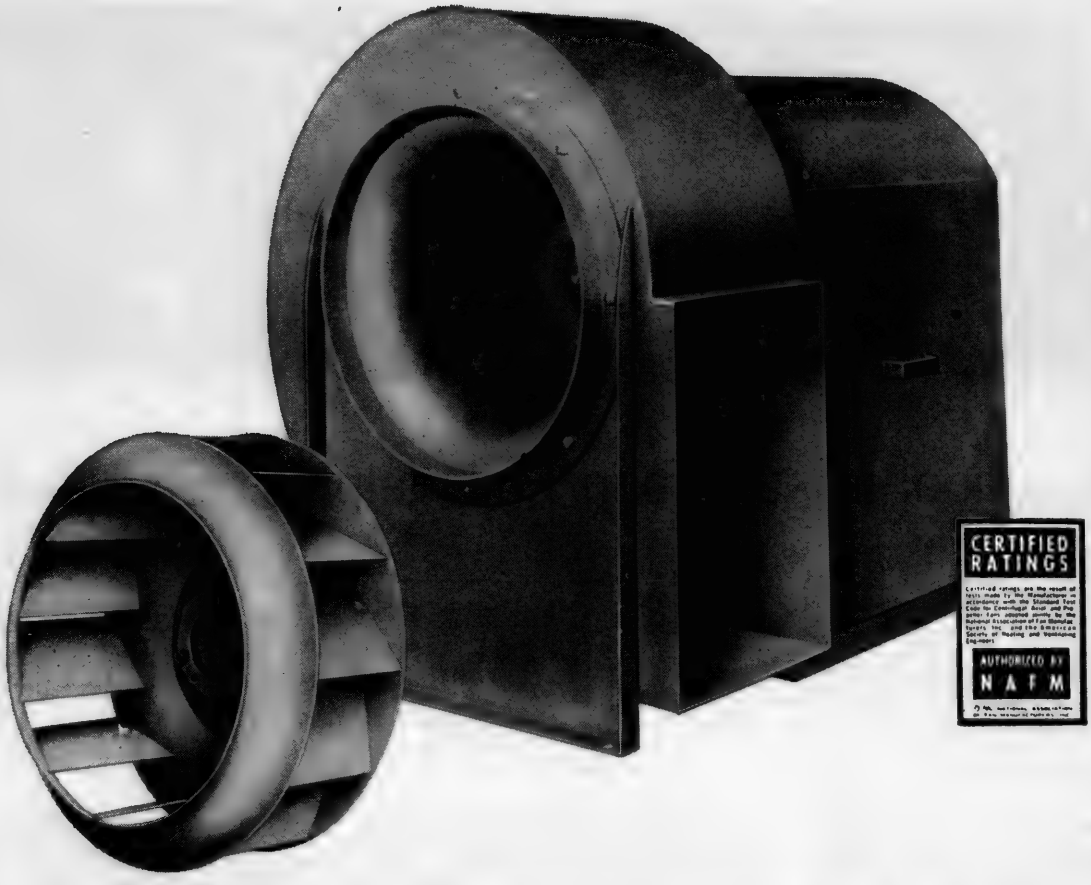

Some of the many components in this Powers Control System
LIMITEM Thermostat
DAY-NIGHT Thermostat
POWERSTROKE Motor
PACKLESS valves Reduce maintenance and prevent leakage of steam or water
FLOWRITE Valve

For further information contact our nearest office

THE POWERS REGULATOR COMPANY

SKOKIE, ILLINOIS | *Offices in chief cities in U.S.A., Canada and Mexico*

65 YEARS OF AUTOMATIC TEMPERATURE AND HUMIDITY CONTROL

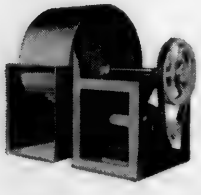


Backward Curve Blowers—Certified Ratings

Completely Designed, Engineered and Manufactured by Peerless Electric

Peerless Backward Curve Blowers are all Peerless—motor and all. We control the entire production of this versatile blower, from drawing board to finished product. We guarantee it unconditionally for quiet, trouble-free operation.

Peerless Backward Curve Blowers can be specified with confidence. They are thoroughly tested according to test codes. They meet NAFM and NEMA standards. Scores of them are operating in schools, churches, hospitals and government installations.

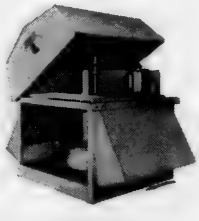


FORWARD CURVE BLOWERS

Made entirely by Peerless; arc-welded housings and frames; wheels designed for quieter operation; dynamically balanced.

CENTRIFUGAL ROOF VENTILATORS

Matching wheel cone accurately fits spun venturi for quieter, smoother air movement. All welded construction; material 16 ga. or over. Each unit air tested, and rated to assure certified PFMA ratings. Fits standard curbs.



Charter Member of the Air Moving and Conditioning Association

Peerless Electric

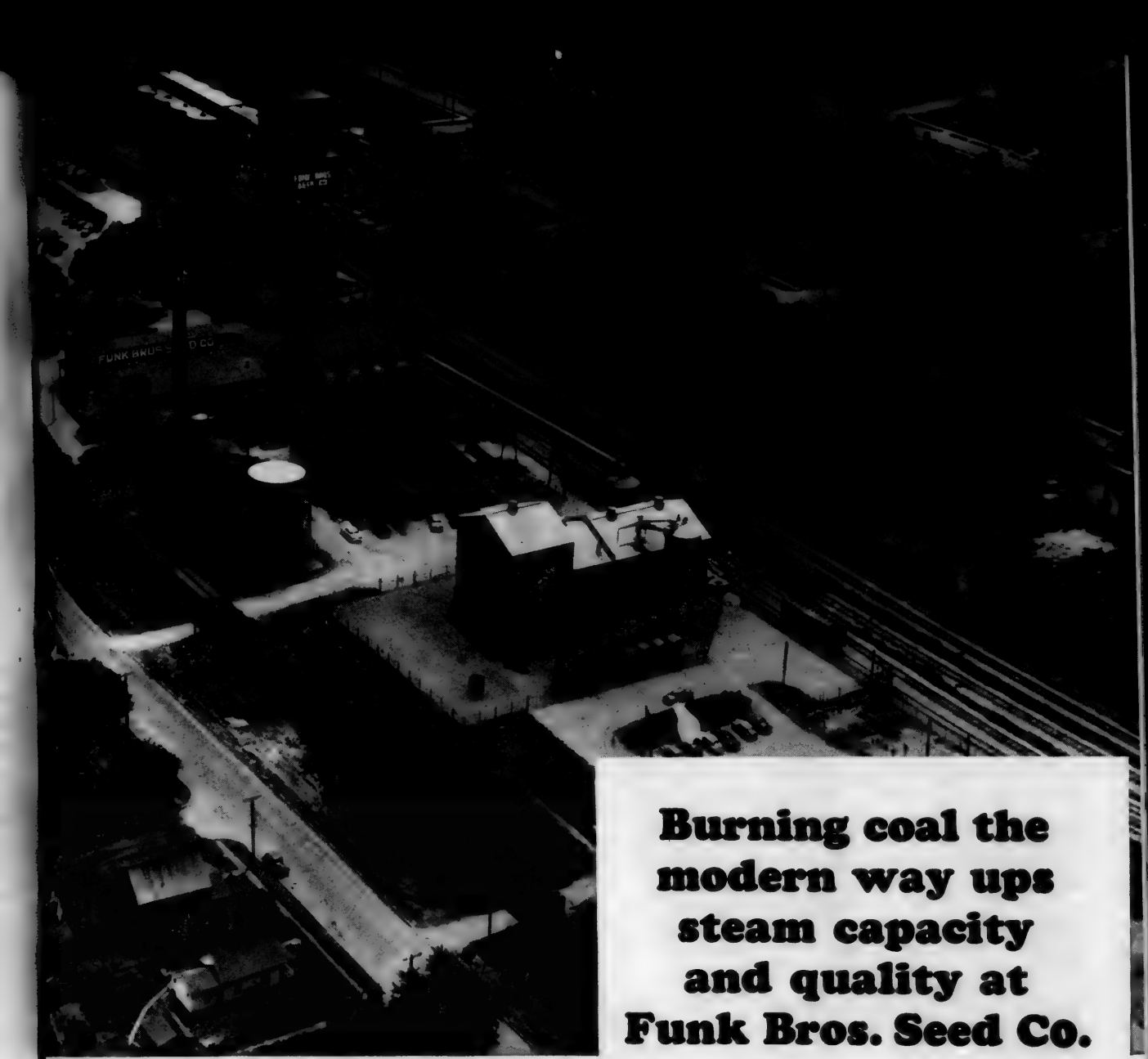
FAN AND BLOWER DIVISION

THE Peerless Electric® COMPANY

1400 W. MARKET ST. • WARREN, OHIO

FANS • BLOWERS • ELECTRIC MOTORS • ELECTRONIC EQUIPMENT

Write Today for Bulletins SDA-220, SDA-200 and SDA-160.



Burning coal the modern way ups steam capacity and quality at Funk Bros. Seed Co.

Consult an engineering firm

Designing and building hundreds of heating and power installations a year, qualified engineering firms can bring you the latest knowledge of fuel costs and equipment. If you are planning the construction of new heating or power facilities—or the remodeling of an existing installation—one of these concerns will work closely with your own engineering department to effect substantial savings not only in efficiency but in fuel economy over the years.

facts you should know about coal

In most industrial areas, bituminous coal is the lowest-cost fuel available • Up-to-date coal burning equipment can give you 10% to 40% more steam per dollar • Automatic coal and ash handling systems can cut your labor cost to a minimum. Coal is the safest fuel to store and use • No smoke or dust problems when coal is burned with modern equipment • Between America's vast coal reserves and mechanized coal production methods, you can count on coal being plentiful and its price remaining stable.

As Funk Bros. Seed Co., Bloomington, Ill., increased the capacity of its soybean extraction plant 50%, the firm's old steam plant proved inadequate. Not only was it unable to produce enough steam, but steam quality was not suitable for best processing conditions. To remedy this situation, the company installed a new 26,000 lbs./hr. boiler, automatic controls, automatic coal and ash handling system and related equipment.

Today the steam plant at Funk Bros. requires only one man per shift, holding one of the most attractive operating jobs in the plant. Evaporation rates are in excess of 9 lbs. of steam per lb. of coal and there is adequate high quality steam for further expansion requirements. Also cleaner plant conditions resulting from this modernization have greatly improved community relations.

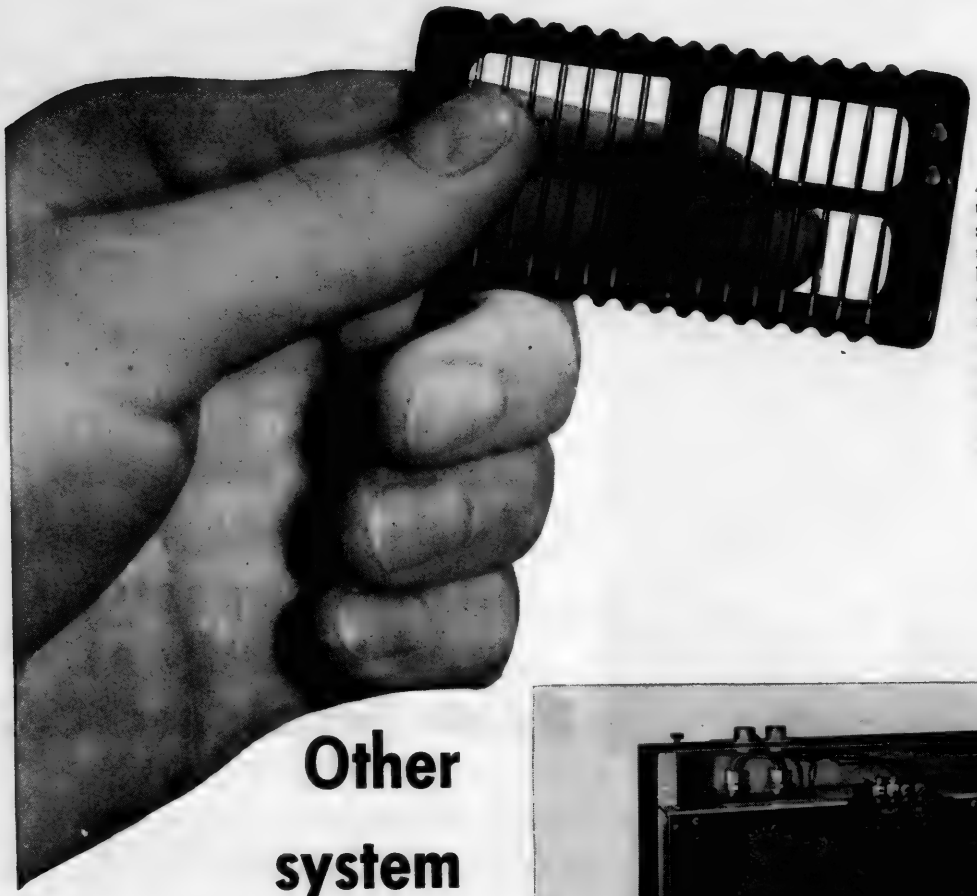
For further information or additional case histories showing how other plants have saved money burning coal, write to the address below.

BITUMINOUS COAL INSTITUTE
Southern Building • Washington 5, D. C.

Control leadership through advanced engineering—research

HONEYWELL ELECTRONIC CONTROLS

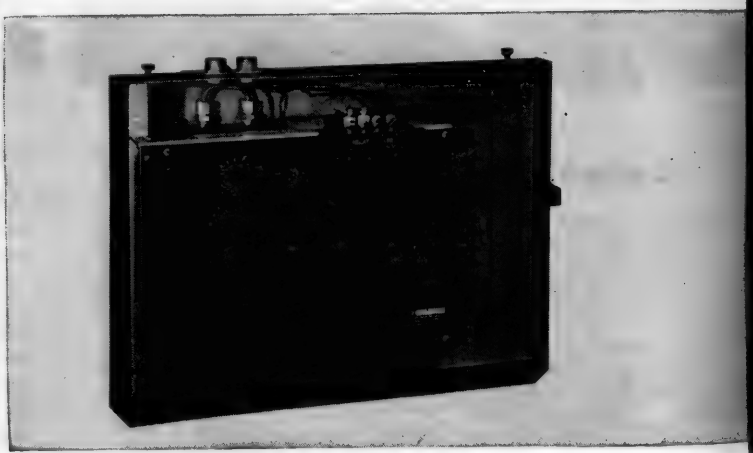
Electronic thermostat



Sensing element—strand of fine wire

A change in temperature changes the resistance of wire wound on a spool—the heart of an electronic thermostat. On this principle is based the simplest and most efficient form of temperature control for buildings—Honeywell Electronic. The sensing element can be fitted to any application. It can be strung the width of a duct, or it can be tightly coiled. It need not be accessible because adjustments can be made remotely.

Other system components



Electro-Pneumatic Relay—RO7900

This unit in conjunction with its electronic thermostats fulfills the function of pneumatic thermostats and puts out a control air pressure from an electronic sensing signal for use in a normal pneumatic control system. The RO7900 brings electronic convenience, sensitivity and simplicity to your master-submaster jobs. It ties in the benefits of electronic sensing with your basic pneumatic system. When you replace your pneumatic thermostat with an electronic—and use it with the RO7900—all checking, adjustment and maintenance is done at the panel, eliminating all attention at the thermostat.

OL-SIMPLE WAY TO DO A BETTER JOB

Gives you flexibility in thermostat location, system functioning—and requires virtually no servicing

WHEN IT comes to performance, no other temperature control system comes close to matching the flexibility of Honeywell Electronic.

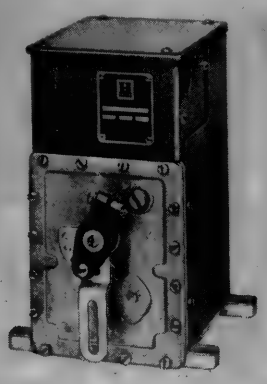
Because the control point and throttling range are unlimited, it is highly adaptable to any building control application.

And because it's *electronic* you can easily and inexpensively use additional thermostats for averaging—or for improved stability and accuracy. An example: the three-thermostat team, one in space, one in discharge air or water, one outdoors. And the faster response of electronic thermostats gives better performance for any client. Also, you can easily tie in electronic master control with pneumatic or electric controls.

When it comes to service, the wonderful simplicity of Honeywell electronic controls becomes readily apparent.

Thermostats, because they have no moving parts, give little trouble, need not be accessible. Checking and adjusting is all done remotely, electronically.

For complete information on Honeywell Electronic Controls, call your local Honeywell office. Or write direct to Honeywell, Department HV-3-109, Minneapolis 8, Minnesota.



For another big, exciting Honeywell development in electronics, turn the page.

Electronic Motor—M7021

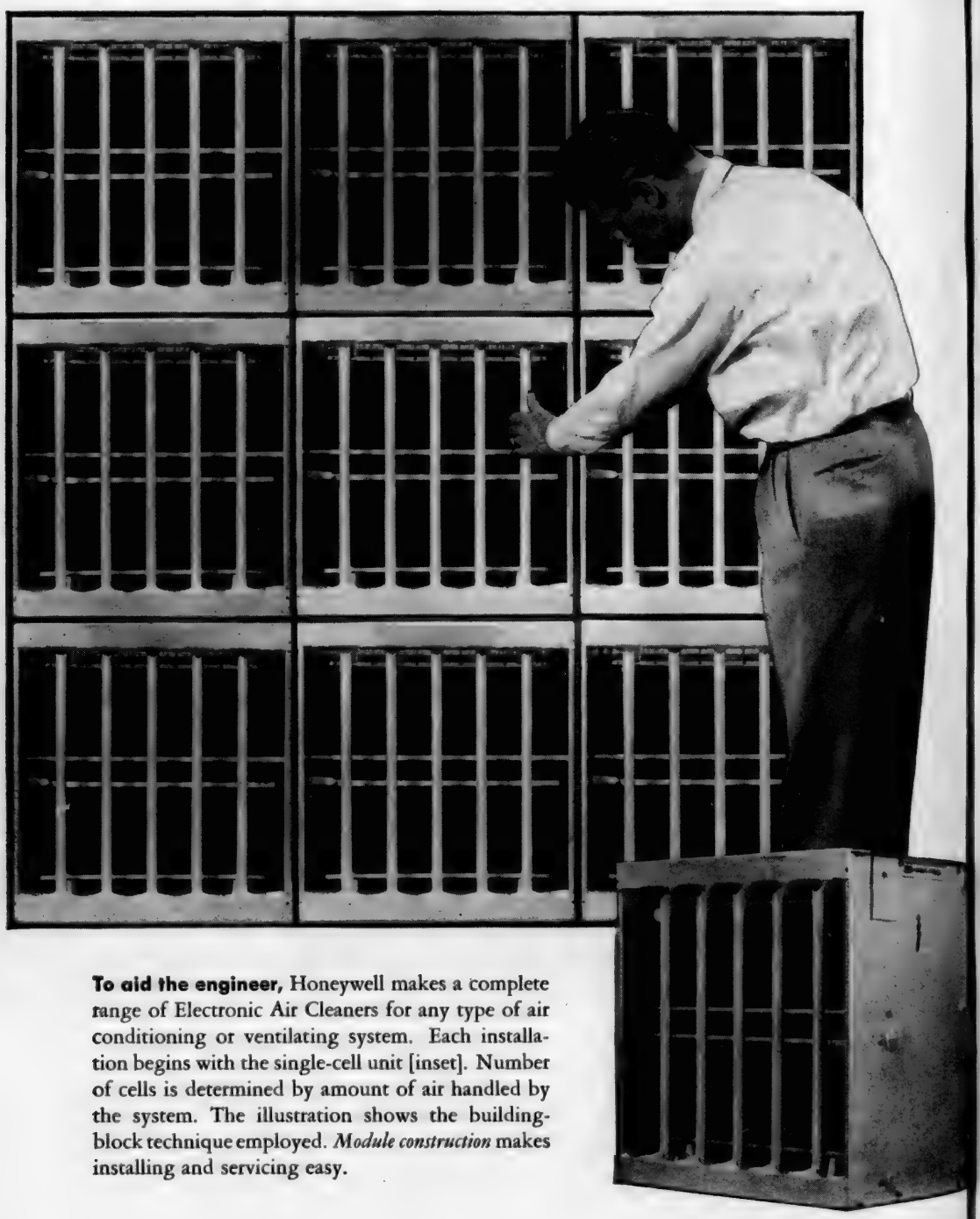
This damper or valve motor gives the advantages of an electronic control system without the necessity for a large control panel. Incorporated in the motor are the normal electronic amplifier and panel. It offers most of the advantages of a large control panel, yet is compact and simple. You have the finest, most stable type of control, you save wiring from panel to motor, save cost of mounting panel, save the space needed by a conventional panel. Installation is very simple and quite economical. And the price is lower than if you were to buy a panel and motor separately.

Two Position Control—L6018

The L6018 is one of a complete line of two-position controls and remote-bulb thermostat controllers for electronic or electric systems. These can be used for many switching functions—like automatic summer-winter changeover of large systems or even individual room conditioners. There are four models of the L6018—A, B, C, D. Each provides a different switching action for various control functions. Together they give an idea of the breadth of the Honeywell line. All controls in this series are low-cost, yet accurate. They are simply built for aiding installation and maintenance.

Control leadership through advanced engineering—research

HONEYWELL ELECTRONIC AIR CLEANER-E



To aid the engineer, Honeywell makes a complete range of Electronic Air Cleaners for any type of air conditioning or ventilating system. Each installation begins with the single-cell unit [inset]. Number of cells is determined by amount of air handled by the system. The illustration shows the building-block technique employed. *Module construction* makes installing and servicing easy.

END TO AIRBORNE DIRT PROBLEMS

Now, from the leader in automatic controls for air conditioning comes another progressive step toward ideal control of indoor climate

THE ELECTRONIC Air Cleaner is the most recent addition to Honeywell's world-famous line of products for the control of indoor comfort.

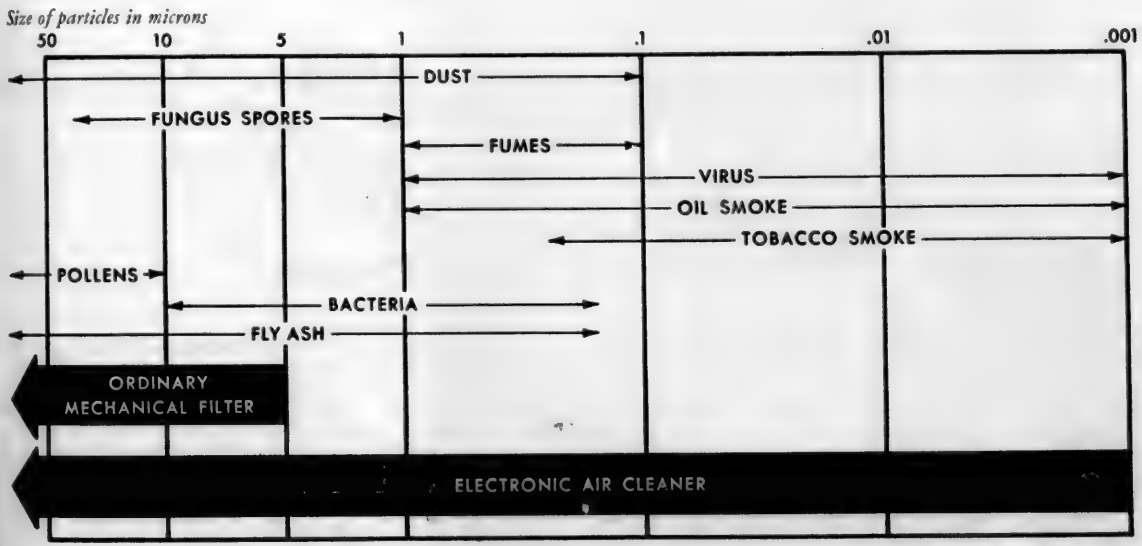
When you install it you assure your clients freedom from the costly scourge of airborne dirt—freedom that ordinary impingement-type filters can never provide.

The superiority of electronic air cleaning is described graphically below, suggesting that a Honeywell Electronic Air Cleaner begins to amortize itself the day it's installed.

And because this is a Honeywell product, you get nation-wide service from reliable field engineers who talk your language.

For complete information on the Honeywell Electronic Air Cleaner, call your local Honeywell office. Or write direct to Department HV-3-109, Minneapolis 8, Minnesota.

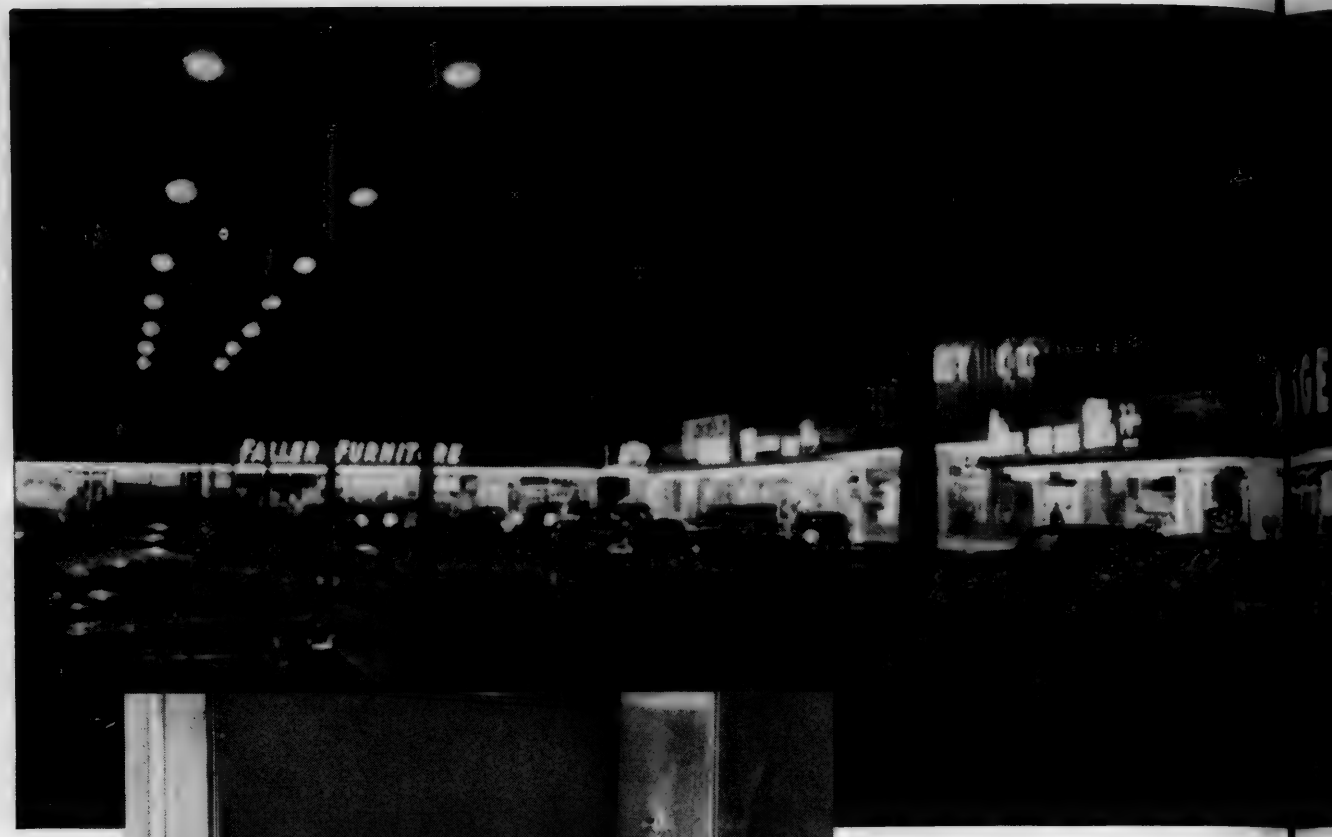
Efficiency Comparison of Electronic Air Cleaner and Mechanical Filter



As shown above, common airborne contaminants range in size from beyond 50 to .001 microns. In this area lie dust, pollens, fungus spores, bacteria, fly ash, fumes, oil smoke, virus and tobacco smoke. It should be noted that the ordinary mechanical filter removes very few of the airborne particles of less than 5 microns in size. But notice the wide range of protection offered by the Honeywell Electronic Air Cleaner. Here you get not only the removal of the large coarse particles, but the microscopic ones, as well—a major cause of soiling and many respiratory ills.

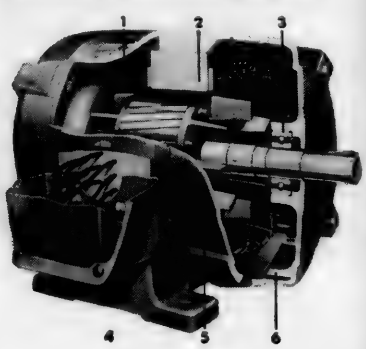
Honeywell

First in Controls



JOB TESTED

1. Fortified insulation lasts longer; resists moisture, oils and chemicals 2. Unitized stator gives better electrical performance 3. Pre-lubricated bearings eliminate on-the-job greasing 4. Precision manufacturing produces smooth, quiet operation 5. Armorized frame shrugs off physical abuse, stands up to attacks of foreign elements 6. Drip-proof ventilation gives complete protection *regardless* of mounting position.



Westinghouse *Life-Line A* motors customer approved for air conditioning

Westinghouse Life-Line® "A" motors have been thoroughly tested in tough air conditioning jobs throughout the country . . . and proved *outstanding* for rugged performance, dependability and extremely quiet operation.

Precision manufacturing and dynamic balancing of this Westinghouse motor have produced the quietest operating unit available. Tests in soundproof laboratories prove this Life-Line "A" motor produces an operating sound level lower than other standard motors.

Armorized frame provides rigidity to prevent armature misalignment even with heavy shaft loads . . . protects motor from physical abuse and contamination. Ventilation openings in the end brackets make the Westinghouse motor *completely* drip-proof, regardless of mounting position. Life-Line "A" 4-way sealed, prelubricated bearings keep grease in . . . dirt and water out . . . eliminate on-the-job greasing in out-of-the-way applications.

For complete information, call your local Westinghouse distributor or write Westinghouse Electric Corporation, 3 Gateway Center, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-22004

YOU CAN BE SURE . . . IF IT'S Westinghouse

One of . . .

Northern Ohio's Largest Industrial Distributors Stocks YOUNGSTOWN STEEL PIPE Exclusively

Akron's 97-year-old Hardware & Supply Co. knows quality pipe—its customers demand only the best pipe—so every length in their stock room is marked—"Youngstown". As this veteran distributor's thousands of customers in the Akron-Canton-Massillon area have found from experience, it will pay you to know and deal with your nearest Youngstown distributor. He's in business for only one reason—to supply what you want, when you want it, and in the quantity you require.

The Hardware & Supply Co. is typical of leading Youngstown distributors throughout the country who provide:

- Immediate delivery from large, complete stocks which permits reduction of your inventory
- A single source of supply that will simplify and expedite your purchasing, receiving, and bookkeeping, and,
- 24-hour service—365 days a year

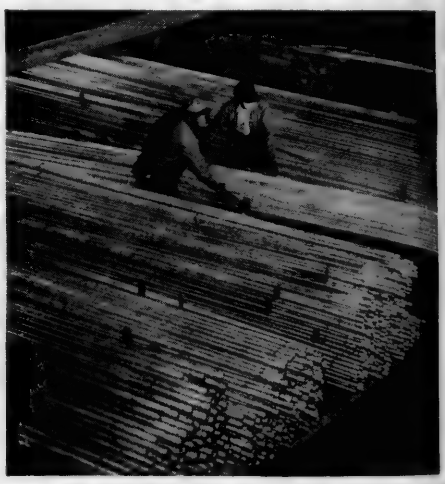
Your Youngstown Distributor is waiting to serve you—why not call him today?

Next time you need steel pipe—for any use—specify Youngstown and secure these 7 points of uniform goodness

uniform ductility
uniform lengths
uniform threading
uniform weldability
uniform wall thickness and size
uniform strength and toughness

uniform roundness and straightness

Another load of quality Youngstown pipe is ready to leave the shipping dock—an hour after the order is received.



Hardware & Supply Co. can fill any customer's order from their large, complete stock of Youngstown pipe.

YOUNGSTOWN PIPE

QUALITY YOUNGSTOWN SERVICE

THE YOUNGSTOWN SHEET AND TUBE COMPANY

Manufacturers of Carbon, Alloy and Yoloy Steel

General Offices - Youngstown 1, Ohio

District Sales Offices in Principal Cities

Jenni Genetron says: ***"When ordering refrigerants . . .***

Always Insist on genetron®

Super-Dry Refrigerants

By Name as well as Number"

. . . and you're sure of top performance—because Genetron refrigerants are *super-dry!*

Carried by leading wholesalers from coast-to-coast.

When you see your wholesaler, ask for—

genetron 11	ORANGE LABEL	TRICHLOROMONOFLUOROMETHANE
genetron 12	WHITE LABEL	DICHLORODIFLUOROMETHANE
genetron 22	GREEN LABEL	MONOCHLORODIFLUOROMETHANE
genetron 113	PURPLE LABEL	TRICHLOROTRIFLUOROETHANE
genetron 114A	DARK BLUE LABEL	DICHLOROTETRAFLUOROETHANE

Allied Chemical

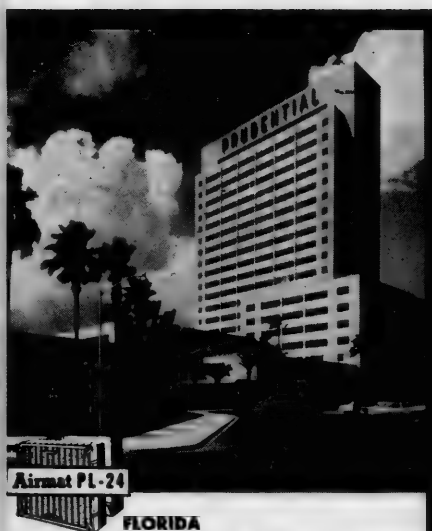
GENERAL CHEMICAL DIVISION

ALLIED CHEMICAL & DYE CORPORATION

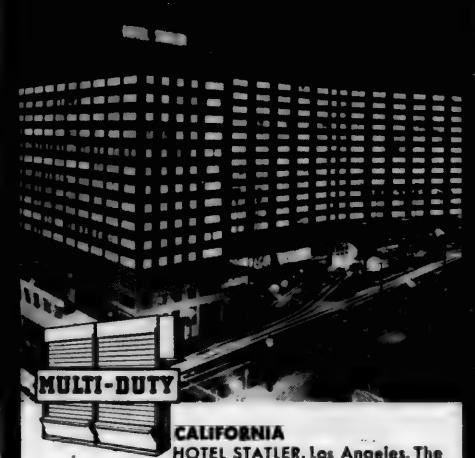
40 Rector Street, New York 6, N. Y.

TENNESSEE
RICH'S DEPARTMENT STORE, Knoxville. AAF's Electro-PL —the only filter combining dry filtration with electronic action — does the air cleaning job here. Maintenance? Periodic replacement of inexpensive Airmat paper media. Architect: Stevens & Wilkerson; Engineer: Edward E. Ashley.

Clean Air by AAF.



FLORIDA
PRUDENTIAL INSURANCE BUILDING, Jacksonville. AAF's Airmat PL-24 is on duty here. Periodic replacement of Airmat paper media takes care of maintenance duties. Architect: Kemp, Bunch & Jackson; Engineer: Edward Van Wagnen.



CALIFORNIA
HOTEL STATLER, Los Angeles. The self-cleaning Multi-Duty viscous filter is on the job here. Maintenance amounts to periodic removal of sludge. Architects, Engineers & Consultants: Holabird & Root & Burgee & Associates.

MINNESOTA
LUTHERAN BROTHERHOOD BUILDING, Minneapolis. Clean air here is by AAF's renewable-media Roll-O-Matic. Maintenance involves merely replacing dirt-laden media roll with a new one. Architect: Perkins & Will; Engineer: E. R. Gritschke.

OHIO
TERRACE PLAZA HOTEL, Cincinnati. Maximum cleaning efficiency with push-button maintenance . . . that's the air cleaning job being done by AAF's Electro-Cell precipitator. Architect: Skidmore, Owings & Merrill; Engineer: Jaros, Baum & Bolles.

MASSACHUSETTS
JOHN HANCOCK MUTUAL BUILDING, Boston. Super-clean air with minimum care was the order here, and AAF'S completely automatic electrostatic precipitator—the Electro-Matic—fills the bill. Architects: Cram and Ferguson; Engineer: Buerkel & Co., Inc.

. . . COAST to COAST

The buildings pictured on these two pages are thousands of miles apart—both geographically and architecturally. They differ, too, in their selection of air filters. But they do have *this* in common: *all filters are AAF filters!*

Instead of selling merely one or two kinds of filters, AAF sells *clean air,* and manufactures more than a dozen different types of filters to achieve it. From the complete AAF line, you can select the filter that gives you the *efficiency you need* plus the *maintenance characteristics you want!*

AAF—and *only* AAF—can recommend the one *right* filter for your specific requirements without compromise. Call your local AAF representative or write direct for further information.

AAF Dust Control Equipment

Illinois Heating Specialties

American Air Filter
COMPANY, INC.
294 Central Avenue, Louisville 8, Kentucky
American Air Filter of Canada, Ltd., Montreal, P. Q.

BETTER AIR IS OUR BUSINESS

Herman Nelson Unit Heaters

Herman Nelson Unit Ventilators

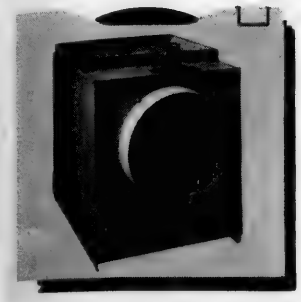
Marley '57 Cooling

Marley water cooling towers have an unprecedented record of high-fidelity service. It's a record built by countless thousands of installations and 35 years of engineering leadership. It's a record certified by contractors and owners for lowest final cost based on investment, long service life and low service cost. And behind the record is Marley's willingness to back every product throughout those 35 years.

Small wonder that year after year far more contractors purchase Marley cooling towers for air conditioning and refrigeration than towers of any other make. This year's Marley line is more complete than ever before — and as always, the accent is on reliability, and highest product fidelity in every respect.

LOOK AT THIS RECORD . . . look at it carefully . . . and you, too, will buy Marley . . . and add to your own record for customer satisfaction.

Towers are "Hi-Fi"



AQUATOWERS®

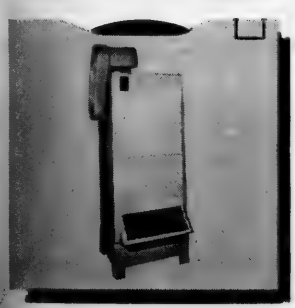
Long recognized as the pace setter in the packaged cooling tower field, Aquatowers are the overwhelming first choice of architects, engineers, contractors and users. Available in a complete range of sizes (12 models) rated from two tons nominal up, they are guaranteed to deliver economical, positive cooling with a minimum of maintenance. Casings are of heavy gauge steel with MarClad finish that guards against corrosion, abrasion and moisture penetration.

SPRATOWERS®

Marley produces a complete line of natural draft SpraTowers ideally suited for air conditioning and refrigeration application where lowest cost per gallon of water circulated is a requirement. They are prefabricated and piece-marked for easy installation. Marley's super-spray system achieves greater water break-up and longer air-water contact. Available in all air conditioning and refrigeration sizes.

WOOD AQUATOWERS®

Incorporating many of the features of the popular steel Aquatowers, Marley's line of wood Aquatowers is especially applicable in areas with highly corrosive atmosphere. Larger models ship disassembled, are easily hoisted and erected. Wood Aquatowers are available in five models.



AQUACOOLERS®

Designed for indoor or outdoor installation, this complete line of Marley towers is available in a wide range of sizes from three tons up. Highlight features are the centrifugal blower that assures whisper-quiet operation, non-clog nozzle water distribution and ample nailless wood filling for maximum water break-up and longer air-water contact. AquaCooler discharge air may be simply and successfully vented to exterior.

Call your Marley distributor for information and prompt delivery of these "hi-fi" performers!

The Marley Company

Kansas City, Missouri

for high-efficiency air conditioning performance, specify

JOHNSON PNEUMATIC CONTROL

Preferred Insurance Company, Grand Rapids, Michigan. Skidmore, Owings & Merrill, architects and mechanical engineers, Chicago; Holwerda-Huizinga Co., mechanical contractor, Grand Rapids.

Ceramic tile mural above the sidewalk is heated by a radiant coil to keep the thousands of tiny tiles intact during freezing weather. A weather-compensated thermostat keeps the panel at a constant temperature.

No matter how you want to control your air conditioning, you can do it better with pneumatic control. You can provide any combination of operating features you need—central control panels, automatic sequencing, automatic compensation, remote temperature readings and all the others.

Pneumatic flexibility solves the most intricate problems as easily as the simplest. Pneumatic control can be applied to all types of air conditioning and to all makes of equipment. In short, it can meet the exact needs of *any* installation!

Pneumatic control offers other, equally important, advantages. It's far simpler than anything else you can use. It has far fewer components. It has fewer parts subject to failure. It's easier to operate and much easier and less costly to maintain. It functions accurately and reliably with a minimum of supervision—there's nothing to require constant checking and adjustment.

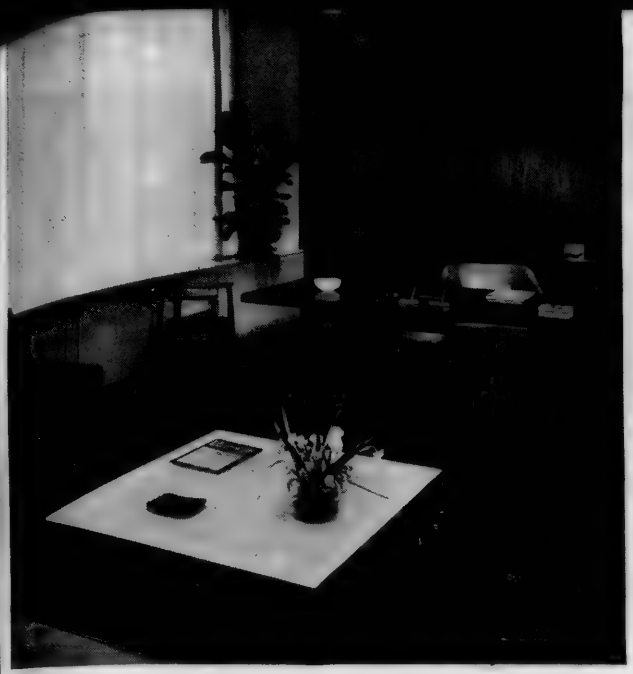
These and other advantages are bringing greater comfort, smoother air conditioning performance and long range operating economies to countless new buildings. The system in the impressive new Preferred Insurance Company Building, shown here, is a good example of what pneumatic control can do for you, too.

Whether your plans involve new construction or a modernizing program, let Johnson, the leader in pneumatic control, give you the full story as it applies to your problems. A nearby Johnson engineer will gladly call at your convenience. Johnson Service Company, Milwaukee 1, Wisconsin. Direct Branch Offices in Principal Cities.

JOHNSON CONTROL

SINCE 1885

PLANNING • MANUFACTURING • INSTALLING



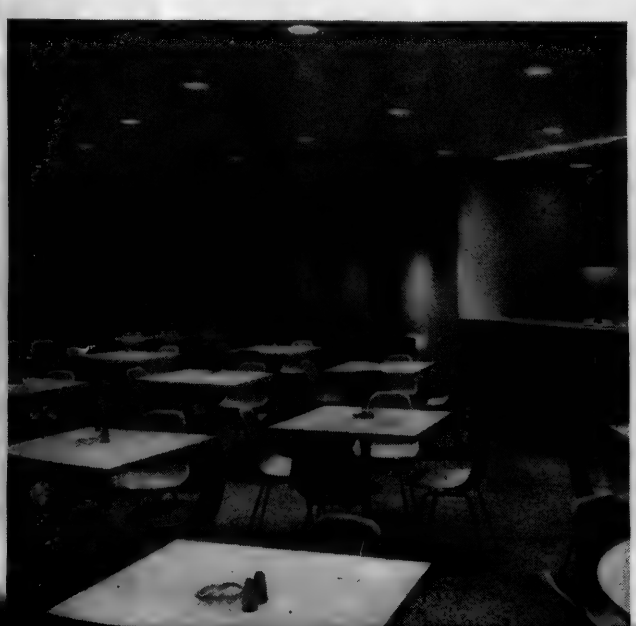
Perimeter offices are heated and cooled by under-window units that offset heat loss or gain from floor to ceiling glass areas. Units are individually controlled by Johnson Thermostats that apply the final heating or cooling effect to the pre-conditioned primary air supply.

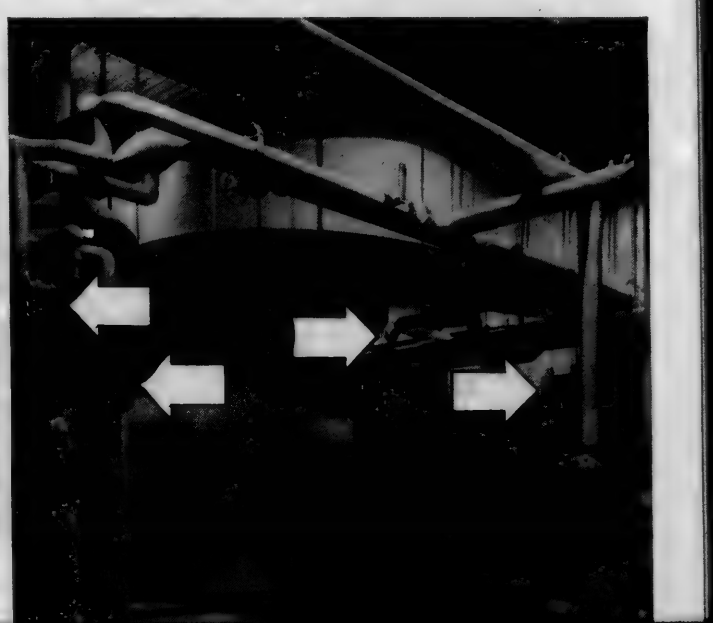
Two large central fan systems supply either cooled or tempered primary air to other sections of the building. Perfectly conditioned air is discharged into each of 29 zones, as directed by strategically located Room Thermostats controlling reheat coils in the system.

Only a *Pneumatic* System Can Satisfy Modern Control Requirements So Completely and Efficiently, Yet So Simply and Economically

Empty, full or only partially occupied, the dining room is always comfortable. Here, Johnson Thermostats easily compensate for changing occupancy levels. Throughout the building all air conditioning equipment, the refrigeration compressor, the main and domestic hot water converters, the fan coil converter, convectors and exhaust fans are controlled by Johnson pneumatic equipment.

Typical Johnson equipment is shown controlling the central fan units. With pneumatic control, high-efficiency air conditioning performance is accomplished with simpler and fewer components than would otherwise be needed. Inexpensive air control gauges, exclusive with pneumatic systems, provide a system-wide check on performance, adding greatly to operating convenience and efficiency.





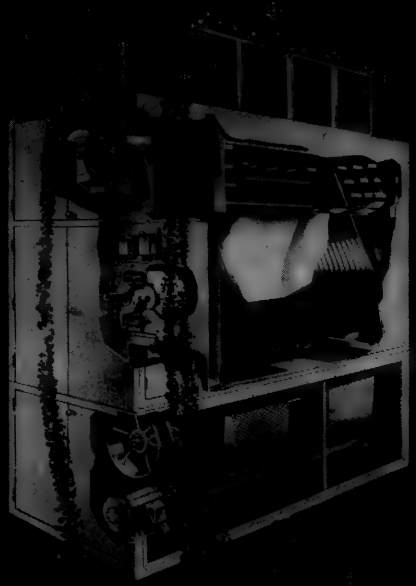
Discharge Plenum

Airfoil
Combustion Chamber

Induced Draft
Firing

Pyrojet Burner

Low-Speed Fans



Dravo presents: the first dual-fuel burner designed specifically for direct-fired heaters

PYROJET *burner tops list of features in all-new Dravo Counterflo heater*

Intensive research by Dravo engineers has resulted in the development of the first dual-fuel burner specifically designed for use in a direct-fired space heater. This burner, the PYROJET, burns light oil, heavy No. 5 oil, or gas with equal efficiency. The combination gas/light oil models feature automatic switchover with *no manual adjustment*. Here are some of the outstanding features of the Dravo PYROJET burner.

- Totally induced draft assures highest combustion efficiency
- Positive ignition of No. 5 oil provided by new dual pre-heater . . . another Dravo exclusive
- Automatic switchover on light oil/gas combination models . . . no manual adjustment
- Ring and finger design minimizes adjustment and service problems
- Combination of zero governor and gas-air premix block assures gas pilot stability
- Control options: on-off, hi-low-off, or full range modulation

Setting new standards of efficiency and convenience, the PYROJET burner is a major part of the entirely new concept of combustion achieved in the all-new Dravo *Counterflo* heater. The stainless steel, airfoil combustion chamber, the new induced draft system, the electronic controls, all contribute to make the new Dravo heater the most economical and flexible space heater available.

Write today for full information on this remarkable new Dravo heater. There is a size and type for every heater application—for economical space heating—for process heating—for tempering make-up air as a duct furnace and for a host of other applications. Address Dravo Corporation, Pittsburgh 22, Pennsylvania.

Ask for Bulletin 564-23

DRAVO
CORPORATION

Blast furnace blowers • boiler and power plants • bridge sub-structures • cab conditioners • docks and unloaders • dredging • fabricated piping foundations • gantry and floating cranes • gas and oil pumping stations • locks and dams • ore and coal bridges • process equipment • pumphouses and intakes • river sand and gravel • sintering plants • slopes, shafts, tunnels • space heaters • steel grating • towboats, barges, river transportation

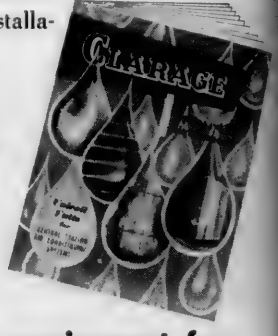
Arthur S. Casella
of E. Kalisch, Inc.,
Contractors

"Our experience made the selection of Clarage a 'must' . . . for the Dime Savings Bank of Brooklyn"

TO WITHSTAND corrosion and assure minimum maintenance, Clarage Unicoils of copper construction were chosen for the air conditioning system of this newly modernized Brooklyn landmark.

These sprayed coil units feature *copper* casings, eliminator plates, and cooling coils . . . and *plastic* spray piping and nozzles. Such features, together with the Unicoil's long-recognized advantages of rugged construction and precise engineering, stand up fully to the severe corrosive action produced by the water in so many regions.

Engineer, contractor, and user satisfaction with the ability of this equipment to perform as specified is shown by the tremendous number of Unicoil installations throughout the nation . . . in buildings of all types, all sizes.



REQUEST Catalog 411, 24 pages of complete information on Unicoil Sprayed Coil Units for central station air conditioning systems. CLARAGE FAN COMPANY, Kalamazoo, Michigan

CLARAGE . . . *dependable equipment for making air your servant*

SALES ENGINEERING OFFICES IN ALL PRINCIPAL CITIES • IN CANADA: Canada Fans, Ltd., 4285 Richelieu St., Montreal

186*

BRUNNER
SINCE 1906

WHOLESALERS ARE ALL OVER THE MAP!

*Yes, 186 Brunner wholesalers . . . from coast to coast . . . place you within easy distance from a Brunner Supply Depot.

Every Brunner Wholesaler carries a stock of Brunner Condensing Units and parts, and is authorized to handle all warranty claims. Here's the fastest, the most complete refrigeration and air conditioning distribution service in the industry.

No lengthy delays, no red tape. Your Brunner Wholesaler is ready to meet your delivery requirements.

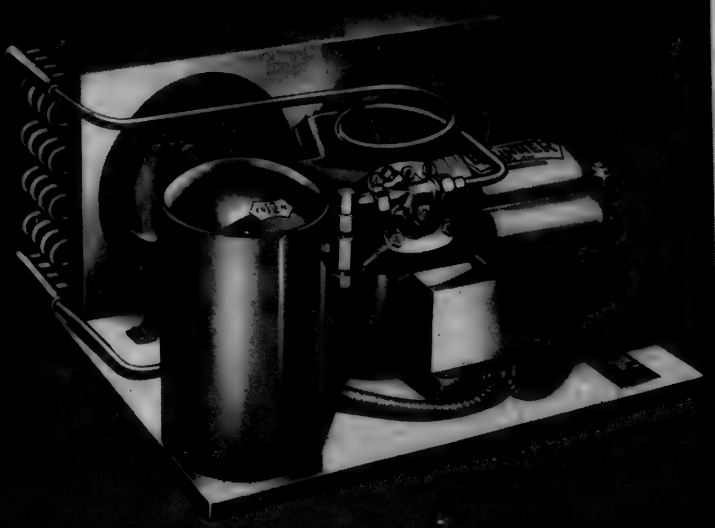
BRUNNER MANUFACTURING COMPANY, UTICA, N.Y.
The Brunner Company, Gainesville, Ga.
In Canada: Brunner Corp. (Canada) Ltd., Toronto, Ont.

GET ACQUAINTED WITH YOUR BRUNNER WHOLESALER

A complete list of Brunner wholesalers will be mailed to you on request

BRUNNER-METIC semi-hermetic Condensing Units available from ¼ H.P. through 3 H.P.

BRUNNER OPEN-TYPE Condensing Units from ¼ H.P. through 100 H.P.



BRUNNER
SINCE 1906

After applying an adhesive to the panel, the pre-cut Pittsburgh Fiber Glass insulation is easily slipped into place. Half-inch Superfine with a .0007 aluminum facing is being used.

Here, ½" Pittsburgh Superfine is being fitted to a panel for an air conditioner. Note how flexible it is.

"We choose Pittsburgh Fiber Glass Insulation because of its consistent specifications and roll-after-roll dependability"

HALL-NEAL FURNACE CO., INDIANAPOLIS, IND.

"An insulating material must be many things," says Robert A. Hoyt, Production Manager at Hall-Neal, "but above all, it must be consistent throughout the roll. Insulation with fibers in varying densities causes 'hot spots' which result in discolored casing, heat loss, and higher fuel bills.

"After trying other types of insulation, we made a 100% change to Pittsburgh Superfine Fiber Glass because of excellent quality and service, close engineering cooperation, realistic price, and fast, dependable delivery."

If you manufacture or install furnaces, air conditioners, or related ductwork, you'll want to know how Pittsburgh Plate Glass Company's Superfine Fiber Glass insulation can exactly meet your insulating requirements. For complete information, write for Bulletins F-100, F-185 and F-190. Address your inquiries to the Fiber Glass Division, Pittsburgh Plate Glass Company, One Gateway Center, Pittsburgh 22, Pennsylvania. Or, for quick service on your specific problem, call the nearest Pittsburgh Fiber Glass Sales Office listed below.

PITTSBURGH SUPERFINE FIBER GLASS IS A PRODUCT OF THE FIBER GLASS DIVISION OF PITTSBURGH PLATE GLASS COMPANY

Sales Offices are located in the following cities: Charlotte, Chicago, Cincinnati, Cleveland, Detroit, Houston, Los Angeles, New York, Philadelphia, and St. Louis

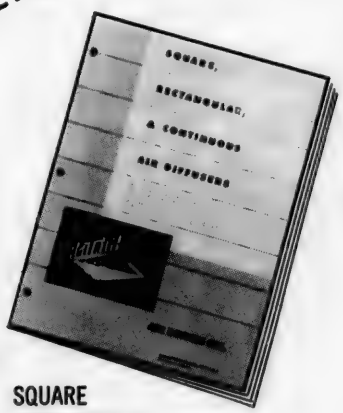
FIBER GLASS

PAINTS • GLASS • CHEMICALS • BRUSHES • PLASTICS

PITTSBURGH PLATE GLASS COMPANY

AGITAIR®

LIBRARY OF ENGINEERING DATA

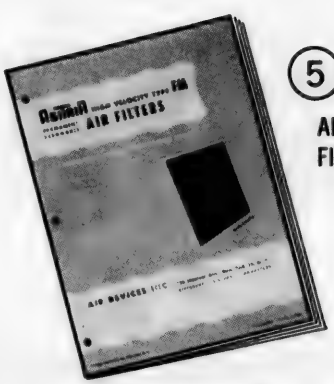


1 SQUARE RECTANGULAR & CONTINUOUS AIR DIFFUSERS

2 HIGH PRESSURE TERMINALS

3 CIRCULAR DIFFUSERS

4 STRIPLINE SLOT DIFFUSERS



5 AIR FILTERS

AIR DEVICES INC.

185 MADISON AVE. NEW YORK 16, N. Y.

Air Diffusers • Filters • Exhausters

Please send catalog(s) circled below to:

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NAME_____

FIRM_____

STREET_____

CITY_____ ZONE_____ STATE_____

"Boy, that ASHAE Show sure opened a lot of eyes...mine included

When I got a look at the one complete air conditioning and heating line this consolidated Dunham-Bush outfit is offering, I was "sold". One source—one responsibility makes a lot of sense to me.

Sure I'm tired . . . but not too tired to do some profit planning with this Dunham-Bush line".

That's the type of talk you heard at the Show, are going to continue to hear.

Dunham-Bush one complete line . . . "close-to-source" supply for faster delivery, lower freight rates . . . expanded engineering and research facilities . . . one source—one responsibility . . . *makes a lot of sense to a lot of people.*

How about you?

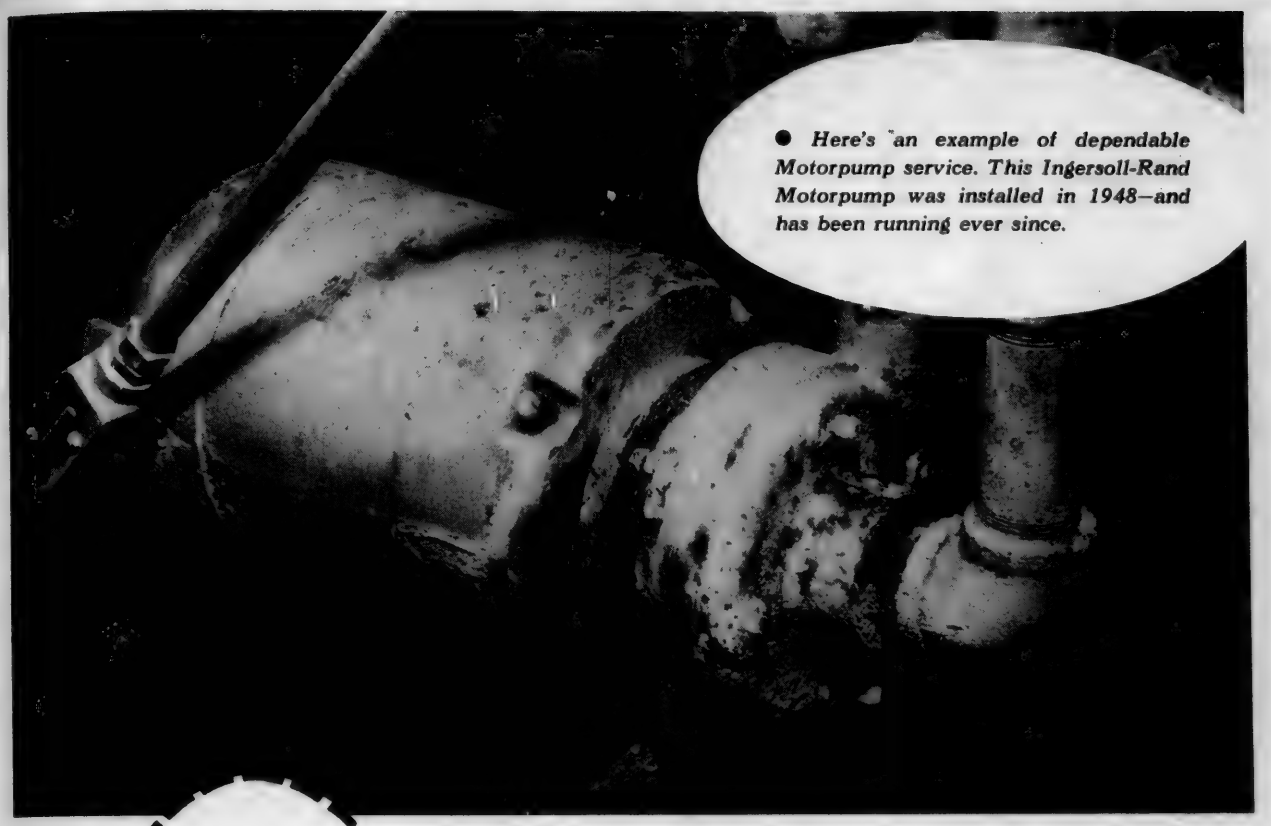
Show Goer who shopped DUNHAM-BUSH

Dunham-Bush, Inc.

WEST HARTFORD 10 • CONNECTICUT • U. S. A.

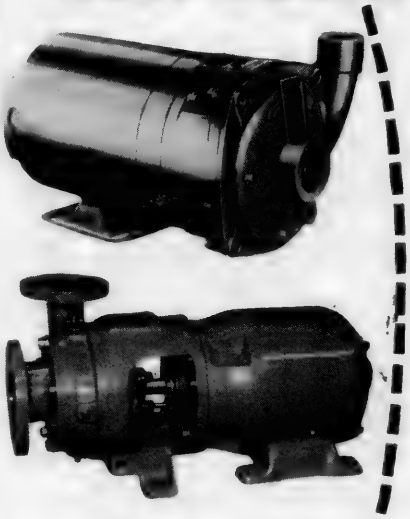
Air Conditioning, Refrigeration, Heating Products and Accessories

MARSHALLTOWN, IOWA • MICHIGAN CITY, INDIANA • RIVERSIDE, CALIF. • TORONTO, CANADA • LONDON, ENGLAND • SUBSIDIARY: HEAT-X, INC., BREWSTER, N. Y.



● *Here's an example of dependable Motorpump service. This Ingersoll-Rand Motorpump was installed in 1948—and has been running ever since.*

Texas installation proves LONG LIFE, LOW MAINTENANCE OF MOTOR PUMP



- *Sizes up to 75 hp*
- *Compact, space-saving*
- *Operate in any position*
- *Simple installation*

One of the big reasons why Ingersoll-Rand's Motorpump is specified as an integral part of so many air conditioning systems is its compact, rugged design and trouble-free operation. Motorpumps are built to give efficient, low-cost operation—and here is just one instance where performance paid off many times over:

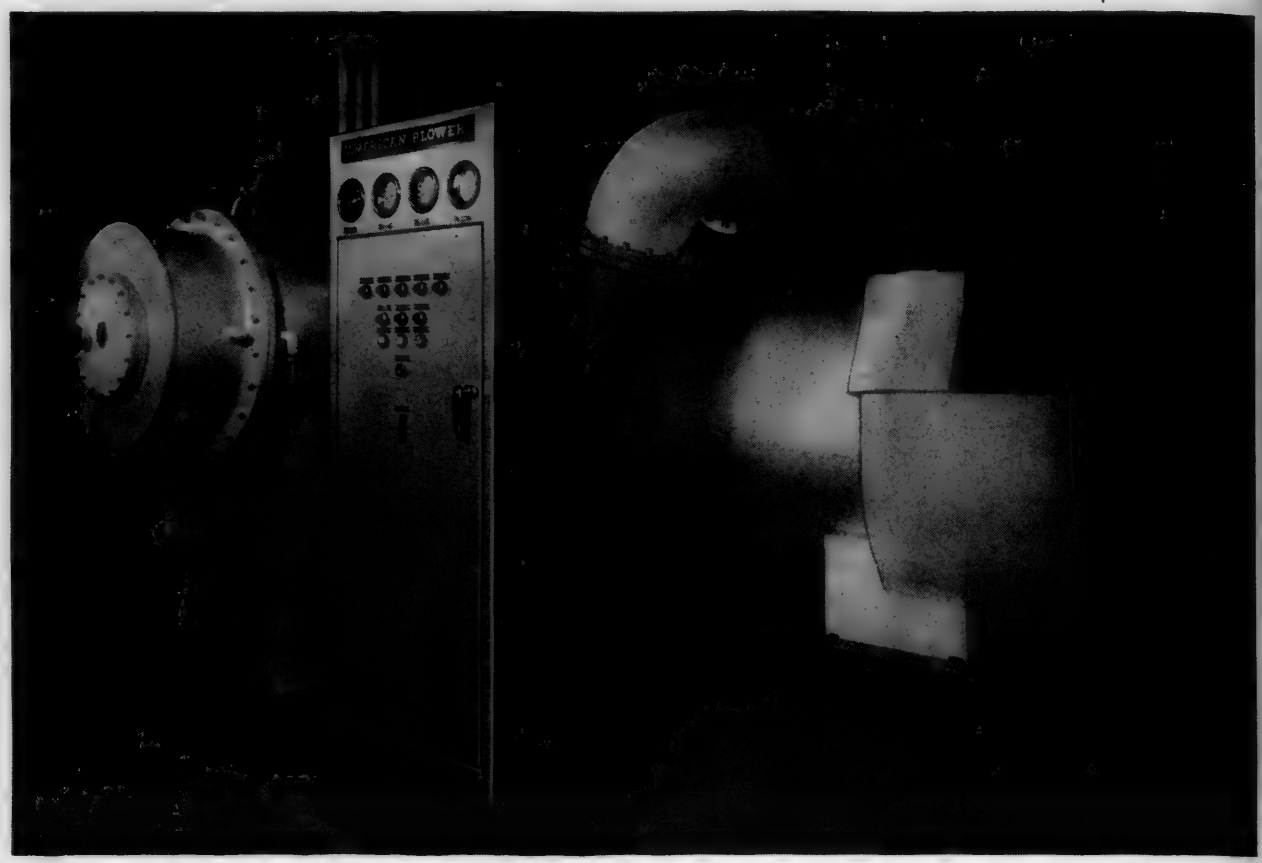
> The 1 hp, 3 phase Motorpump was installed in Corpus Christi, Texas in 1948 on a 5-ton air conditioning system. It has outlasted one compressor unit and one tower, and they've had to replace piping. Existing records and the pump's appearance indicate that there has been no maintenance. It is still in operation.

If you'd like other interesting examples proving the outstanding service advantages of I-R Motorpumps, get in touch with your nearby Ingersoll-Rand representative or write to Ingersoll-Rand, Cameron Div., 11 Broadway, New York 4, N. Y

Ingersoll-Rand

9-408

PUMPS · CONDENSERS · TURBO-BLOWERS · COMPRESSORS · ROCK DRILLS
VACUUM EQUIPMENT · AIR & ELECTRIC TOOLS



Dallas school-administration building's TONRAC adjusts itself immediately to fluctuations in air-conditioning load and weather.

Tonrac — air-conditioning nerve center in new Dallas school-administration building

To meet its growing educational needs, dynamic Dallas, Texas, is sponsoring a multimillion-dollar school-plant expansion program — a part of which is the modern addition to the school-administration building at right.

This streamlined structure is fully air-conditioned by American Blower. Nerve center for the system is the American Blower TONRAC® centrifugal refrigerating machine, which supplies chilled water to the various air-conditioning units. One of the reasons why American Blower air-handling and air-conditioning equipment was chosen, is because American Blower offered a *complete line* of quality equipment — designed, engineered, and manufactured to work together.

When your customer's plans call for air conditioning — call our nearest branch. American Blower Division of American-Standard, Detroit 32, Michigan. In Canada: Canadian Sirocco products, Windsor, Ontario.

One feature of Dallas Independent School District Administration Offices is individual room control of indoor climate in both interior and peripheral zones. Outer offices conditioned by 140 American Blower Inductor Units.

BUILDING CREDITS:
Architect: Peyton Cooper
Consulting Engineers: Zumwalt & Vinther
General Contractor: Hal C. Dyer
Mechanical Contractors: Brown-Olds Plumbing & Heating Corp.

AMERICAN BLOWER

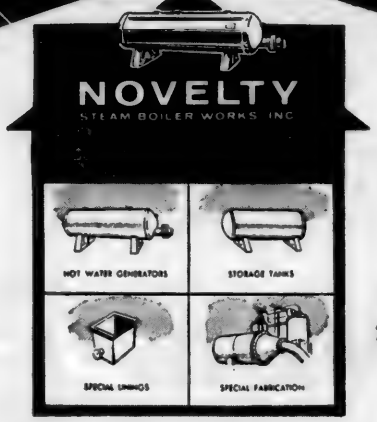
Division of AMERICAN-Standard

Air-conditioning equipment for every business

NOVELTY
breaks the

life quality price

barrier

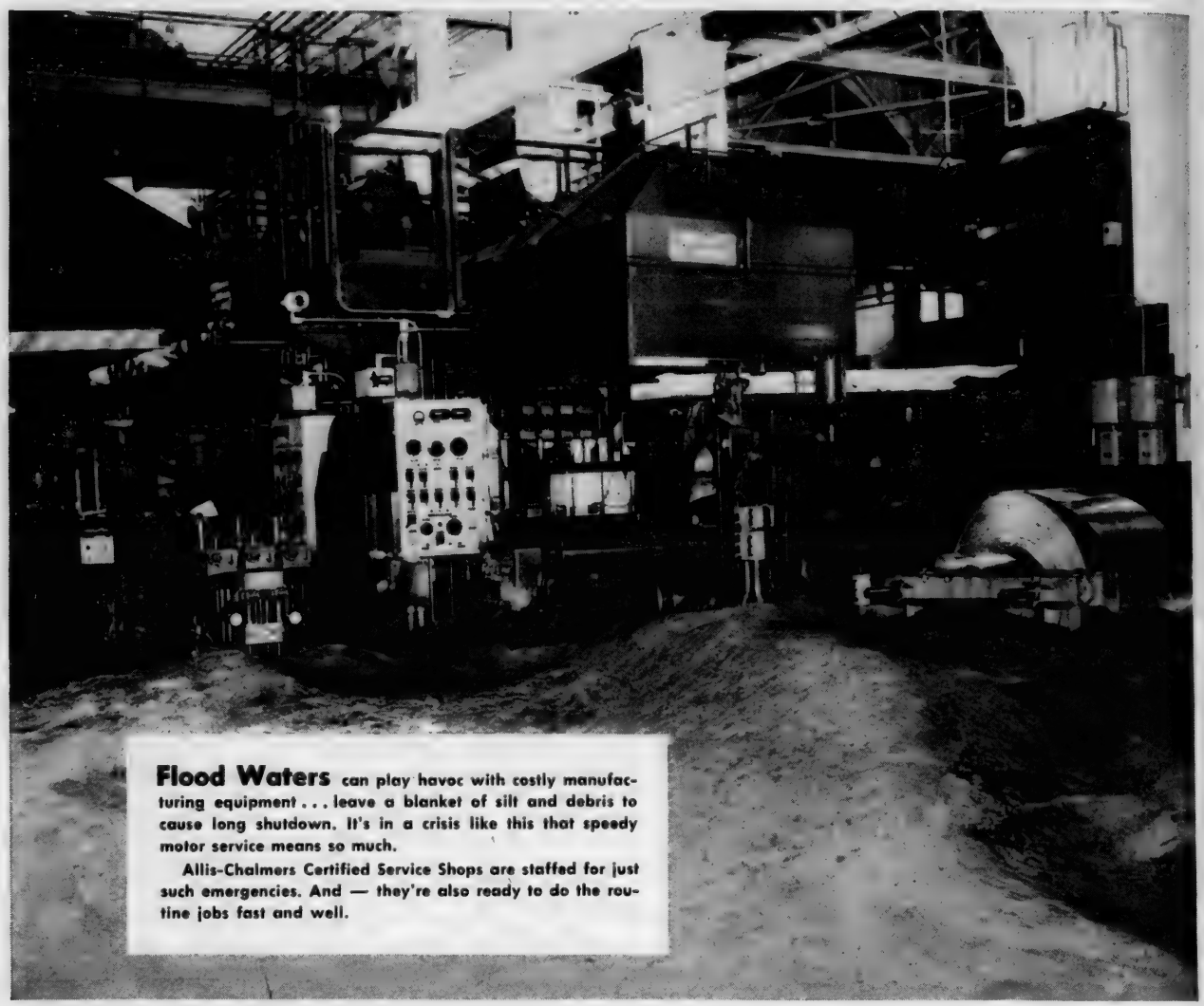


NOVELTY STEAM BOILER WORKS, INC.
2029 KLOMAN ST. • PHONE PLAZA 2-0425 • BALTIMORE 30, MD.

Representatives in Major Cities

Allis-Chalmers "Certified" Service Shops:

When you need motor help



Flood Waters can play havoc with costly manufacturing equipment . . . leave a blanket of silt and debris to cause long shutdown. It's in a crisis like this that speedy motor service means so much.

Allis-Chalmers Certified Service Shops are staffed for just such emergencies. And — they're also ready to do the routine jobs fast and well.

Catastrophe or Routine Service

Whether it's complete catastrophe or a normal repair job, fast motor service can make a difference of thousands of dollars in lost production. As near as your phone is one of more than 100 Allis-Chalmers Certified Service Shops — ready to help save you production dollars.

These shops have manpower and equipment to perform repairs to Allis-Chalmers rigid standards. Their ability and integrity have been proven by years of service. They can do a good, fast job on any motor or generator, of any make. To locate the Shop in your area, call your nearby A-C district office, or write Allis-Chalmers, General Products Division, Milwaukee 1, Wis.

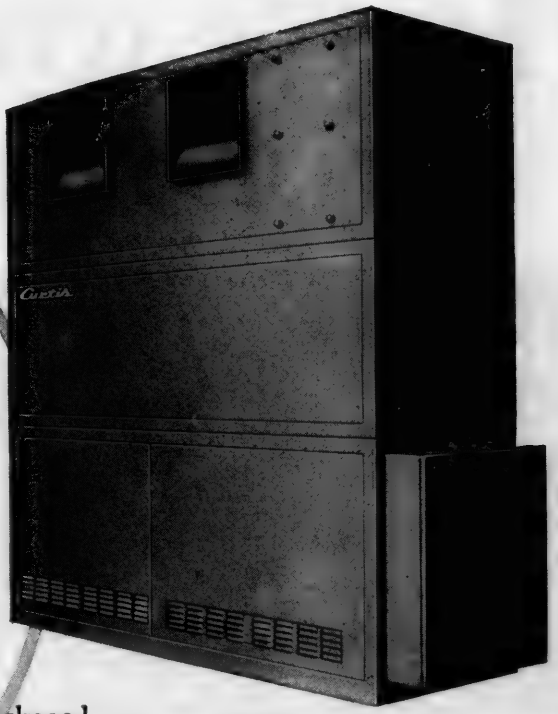
ALLIS-CHALMERS

A-5140

NOW!

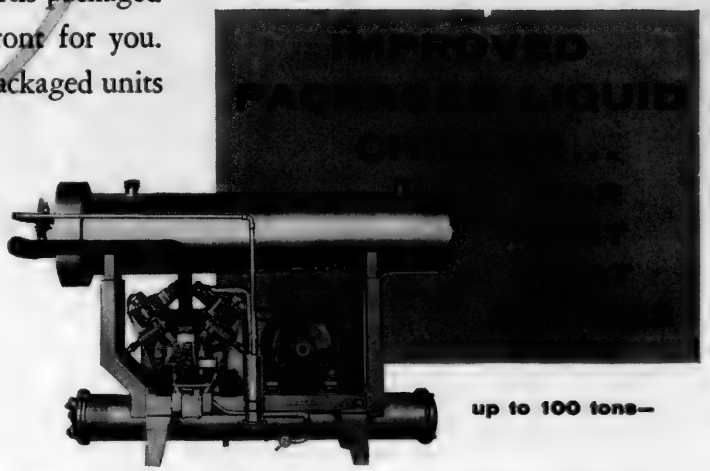
Curtis

PACKAGED UNITS
Up to 50 Tons
OPENS NEW MARKETS FOR PACKAGED AIR CONDITIONING



No question about it. The new 50-ton Curtis packaged air conditioner will open a new sales front for you. Architects, engineers *and* owners prefer packaged units for important reasons:

- Big package units are line assembled—does away with expense of field labor. Assures a BALANCED SYSTEM.
- Packaged units are easier to install—take up less space.
- Cuts down installation problems and maintenance costs.



up to 100 tons—

With all controls in single panel box for easier access and greater protection! Four step capacity control—unloaded starting available. Particularly desirable where year 'round conditioning of multiple individual rooms is required.

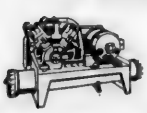
REMEMBER, every Curtis unit is backed by a solid 103 years of experience and skill. Curtis offers a complete line of air conditioning equipment—nationally advertised to help you sell.

YOU CAN COUNT ON

REMEMBER... **Curtis**

OUR 103rd YEAR

New Curtis Packaged, Air Cooled, Air Conditioning Units, 3 thru 7½ tons. Residential and commercial applications.



Condensing Units up to 100 tons. F-12 or F-22.

Air Handling Units, Cooling Towers and Evaporative Condensers to match.

MANUFACTURING COMPANY
REFRIGERATION DIVISION
1999 Kienlen Ave. St. Louis 20, Mo.

CM-16

See these new Curtis units at the International Heating and Air Conditioning Exposition, Amphitheatre, Chicago, February 25 to March 1. Booth numbers 748, 750, 849 and 851.

Here's what makes Bronze Valves

TYPICAL OF WALWORTH QUALITY is the union body-to-bonnet connection which stiffens the body against internal pressure; makes taking the valve apart a simple operation and reduces the chances of distortion or leakage even though the valve is repeatedly taken apart and reassembled. With this type of construction there is no possibility of the bonnet coming off the valve while the handwheel is being turned.

HEAVY BODY CONSTRUCTION is typical of *all* Walworth Bronze Valves. Extra-thick walls and rugged wrench hexes constitute a high safety factor and prevent distortion while the valve is being installed in the pipeline. Extra-deep pipe threads are accurately machined to eliminate leakage. Walworth Bronze Valves are also available with flanged, silver-brazed or soldered ends in certain sizes and types.

MEET THE CHAMP! The chief engineer of a midwestern plant had used a parade of valves in severe boiler blowdown service. Most didn't last longer than 60 days. None survived 90 days.

On the recommendation of a Walworth Representative the engineer installed the Walworth No. 225P Bronze Globe Valve shown here, stating that he would be entirely satisfied if it lasted a bare three months. Exactly 4 years and 362 days later the valve was taken out of service—not due to the wire drawing, steam cutting and galling which made the other valves short-lived—but because the highly turbulent steam finally wore a small hole in the body.

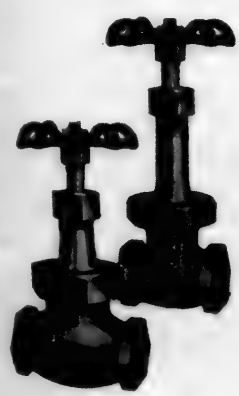
This is the kind of valve satisfaction you get—when you specify and use Walworth Bronze Valves. They are the longest wearing, toughest bronze valves on the market.

Walworth Subsidiaries: ALLOY STEEL PRODUCTS CO. • CONOFLOW CORPORATION • GROVE VALVE AND REGULATOR CO.

Walworth *the* real bargain!

EXTRA-LARGE STEMS with extra-long, extra-deep threads prolong valve life, protect against wear and distortion and provide tight positive shutoff. The surface of the stem is machined to a glass-like finish for minimum handwheel effort and to preserve the packing which results in fewer inspections and less maintenance. The top of the stem is tapered and squared to hold the handwheel securely.

TO REDUCE WIRE DRAWING to a minimum, certain types of bronze globe valves have stainless-steel plug-type seats and discs heat-treated to a nominal hardness of 500 Brinell, adding years to valve life even in severe services. These valves can be tightly closed on sand, grit or pipe scale without damage. Seats and discs are machined simultaneously, assuring perfect mating.

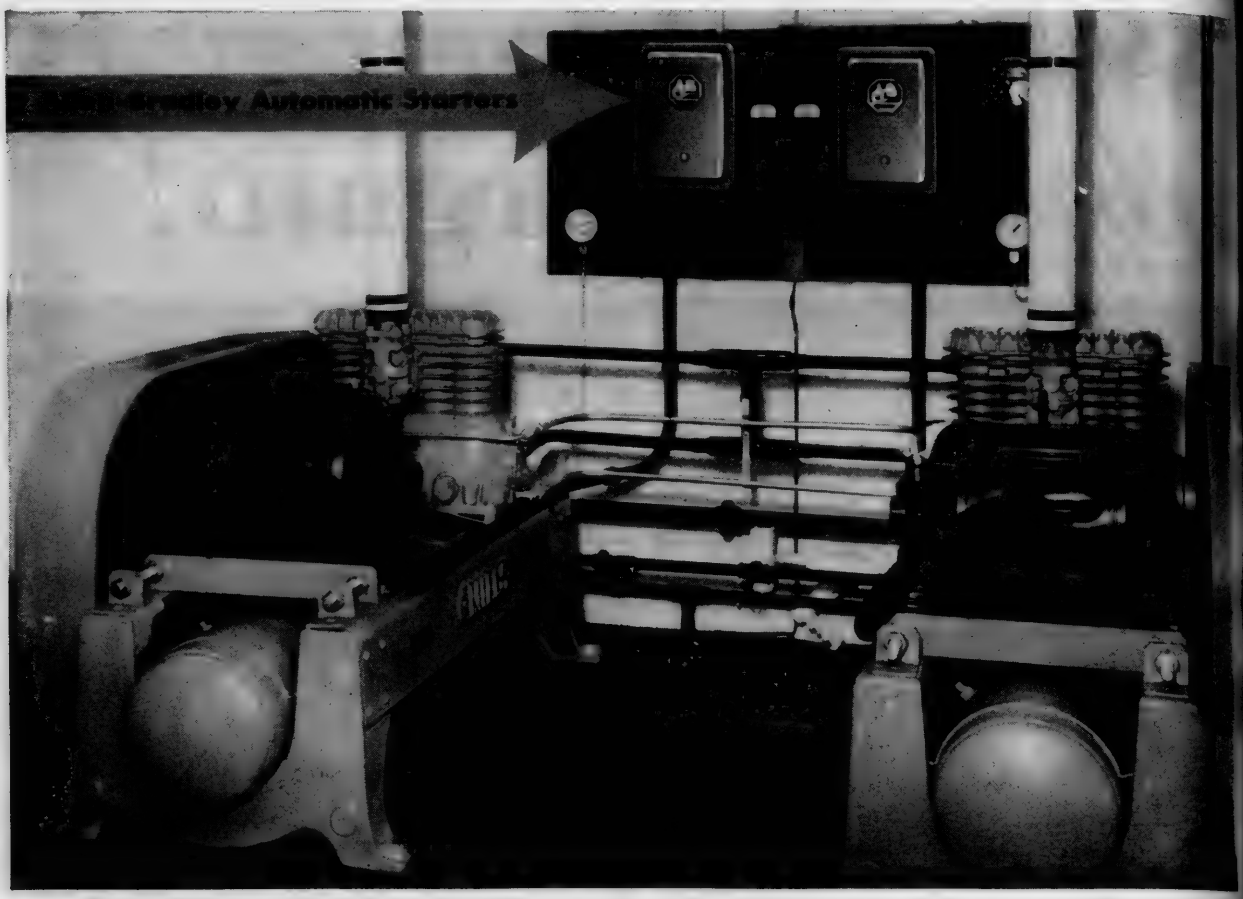


There is a Walworth Bronze Gate, Globe, Angle or Check Valve for every service. Walworth is continually developing new valve types and materials, including plastics, to keep pace with the growing variety and severity of services in modern industry. For full information, see your Walworth Distributor or write:
Walworth, 60 East 42nd Street, New York 17, N. Y.

WALWORTH

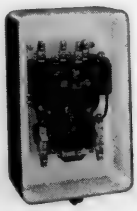
Bronze Valves and Fittings

M & H VALVE & FITTINGS CO. • SOUTHWEST FABRICATING AND WELDING CO., INC. • WALWORTH COMPANY OF CANADA, LTD.



REFRIGERATION MOTOR CONTROLS that are Trouble Free

TYPICAL ALLEN-BRADLEY REFRIGERATION CONTROLS



Bulletin 709 Automatic Solenoid Starter

Temperature Control

Special Refrigeration Control Panel

Why are Allen-Bradley automatic starters so popular for refrigeration and air-conditioning service?... Because they are so trouble free and dependable. Why are they trouble free? Because all A-B starters have only ONE moving part. No pivots, pins, or bearings to corrode or stick ... no jumpers to break. You install them . . . and forget them! No contact maintenance . . . Allen-Bradley cadmium silver alloy contacts never need cleaning, filing, or dressing. A time-saving and money-saving "plus value."

Dependable overload relays . . . Allen-Bradley thermal relays are accurate and remain accurate "on the job" . . . even after years and years of service.

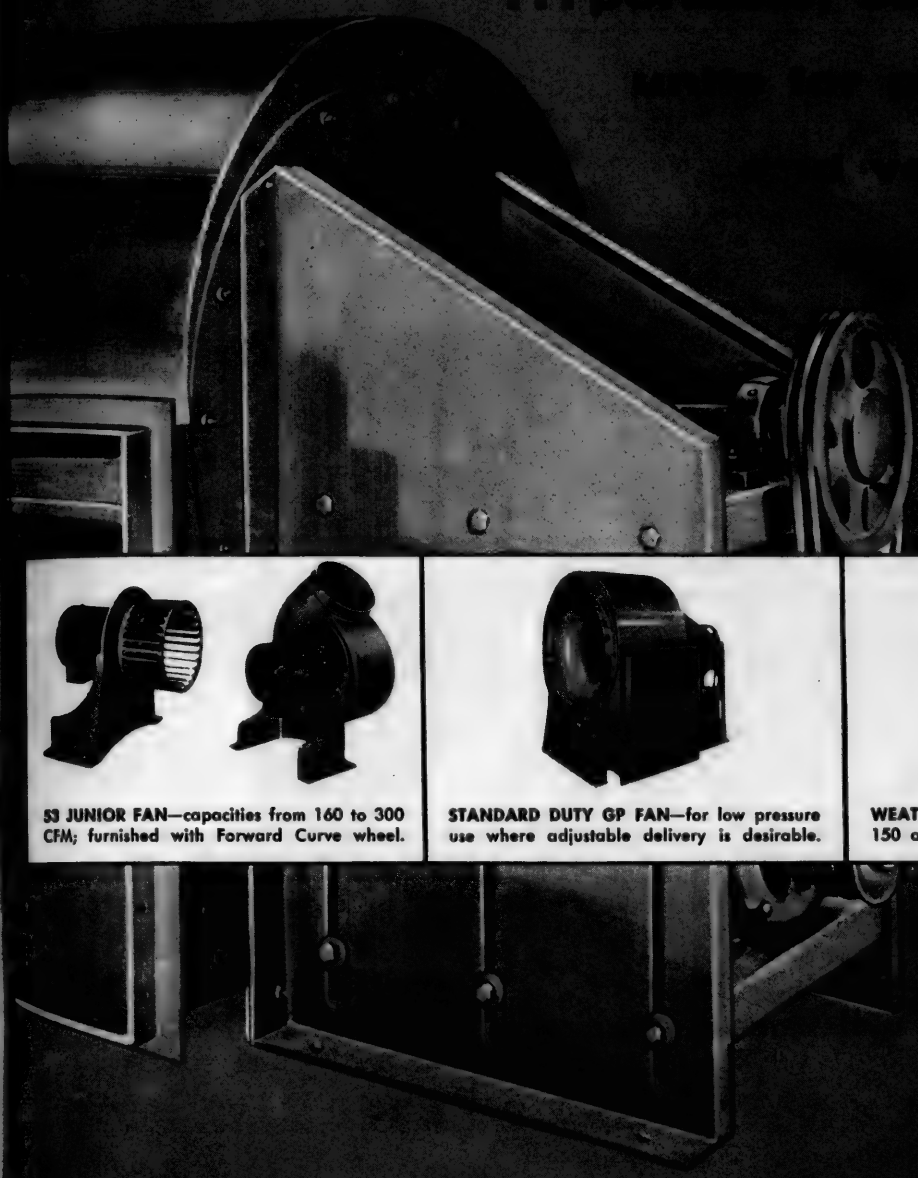
The Allen-Bradley trademark stands for "Quality" in motor control. Remember to specify Allen-Bradley—over the years you'll be money ahead!

Allen-Bradley Co.
1330 S. Second St., Milwaukee 4, Wis.
In Canada—Allen-Bradley Canada Limited, Galt, Ont.

A-B Quality

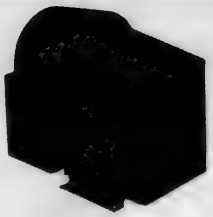
ALLEN-BRADLEY
SOLENOID MOTOR CONTROL
QUALITY

GENERAL PURPOSE FANS



53 JUNIOR FAN—capacities from 160 to 300 CFM; furnished with Forward Curve wheel.

STANDARD DUTY GP FAN—for low pressure use where adjustable delivery is desirable.



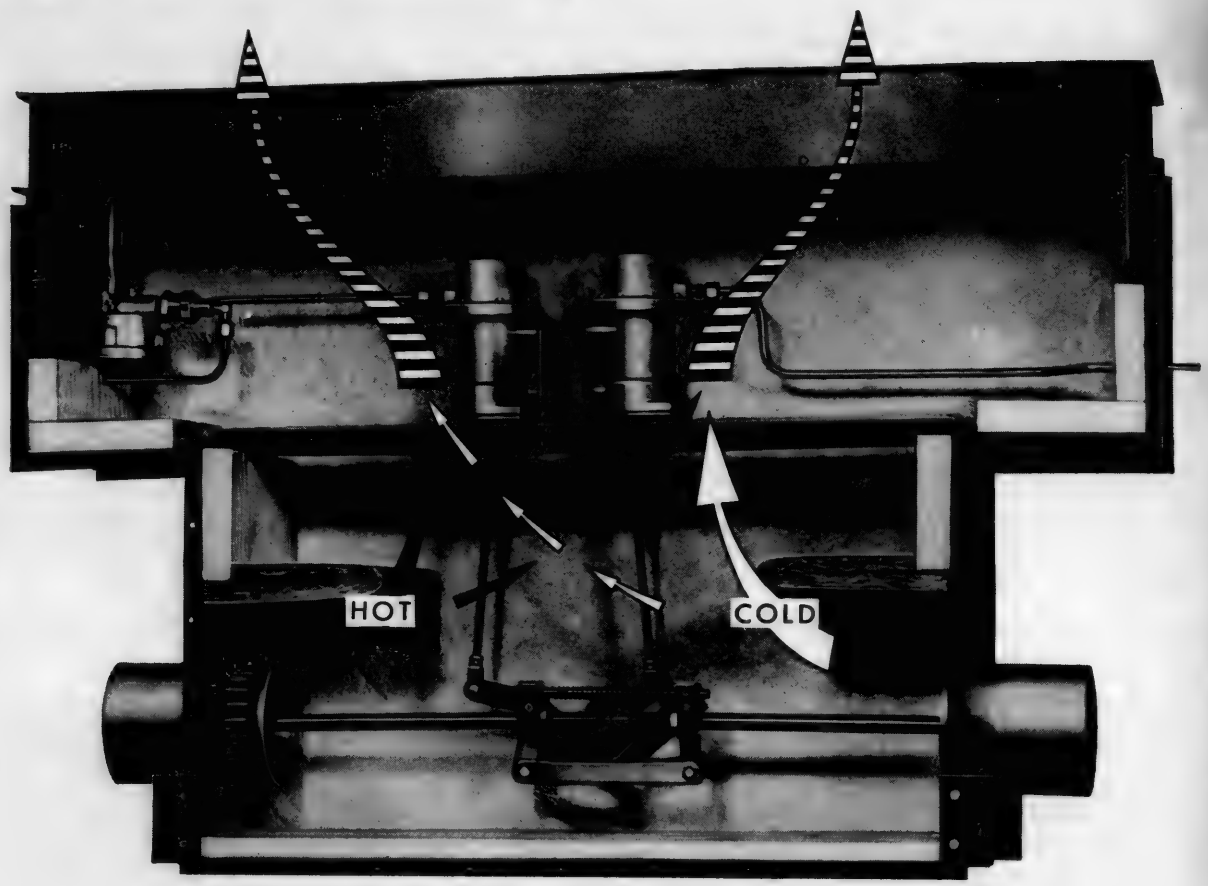
WEATHER COVER — in sizes 75, 90, 122, 150 and 152; shown bolted to fan housing.

nyb

How **ANEMOSTAT®**

All-Air Constant Volume

High Velocity units operate



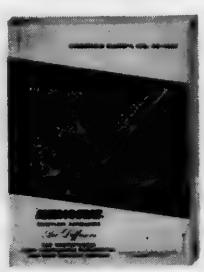
Here is a vitally important advance in the field of air distribution. Anemostat All-Air High Velocity units, *with new simple automatic controls,* deliver constant volume, no matter what the fluctuations from 1:4 or 4:1 on inlet pressures of either the hot or cold valve.

Each unit is a single package including the controls and integral thermostats, if required. There is complete accessibility of all controls through removable diffusers. No access panels are required. Capacities of CONSTANT VOLUME units can be pre-set at the factory.

These Anemostat CONSTANT VOLUME units

- Assure scientific draft-free distribution of air.
- Are available in 100% induction units.
- Include Anemostat die-cast metal rocket-socket valves. More than 50,000 of these valves are in service, and not a single one has needed maintenance.
- Operate on standard 15 lb positive acting compressed air systems.

Each unit contains a micropressure regulator in the box, sensitive to .02 static pressure. This in turn operates a pneumatic motor and independently maintains by adjustment constant volume, while the wall mounted or integral thermostat controls the outlet mixture temperatures.



Write on your business letterhead for your copy of

New Anemostat Selection Manual 60

to Anemostat Corporation of America, 10 East 39 Street, New York 16, N. Y.

ANEMOSTAT: The pioneer of All-Air Velocity Systems

"H" Sky-Vent, 84" size (100,000 CFM), one of four now ventilating a new public utility power plant in Michigan. Shipped as a complete preassembled unit.

66" Style "V" Sky-Vent exhausting 98,000 cfm from enameling oven area of major appliance factory in Kentucky; one of 16 such units at this plant.

EASY TO INSTALL "BUFFALO" SKY-VENT® PACKAGE ROOF VENTILATORS OFFER RUGGED CONSTRUCTION—MAINTENANCE-FREE OPERATION

Here are extremely rugged power roof ventilators with important advantages to you and the customer:

1. For exhausting or ventilating large areas where ductwork may not be desirable.

2. In large capacity range, 1000 thru 50,000 cfm, to permit a minimum number of roof installations — reducing costs.

3. Shipped as ready-to-install units — saving you time and trouble.

4. Built to last! Heavy-gauge stacks with integral curb flanges. Internally braced hoods — moisture proof, wind proof, corrosion resistant.

5. Efficient air handling with standard lines of "Buffalo" Propeller and Axial Flow Fans.

Write for Bulletin FM-2345 and check these increasingly popular package units against your requirements. Your assurance of performance is the "Q" Factor in every "Buffalo" product — the built-in Quality which provides trouble-free satisfaction and long life.

VENTILATING

AIR CLEANING

AIR TEMPERING

INDUCED DRAFT

EXHAUSTING

FORCED DRAFT

COOLING

HEATING

PRESSURE BLOWING

"Buffalo"

BUFFALO FORGE COMPANY

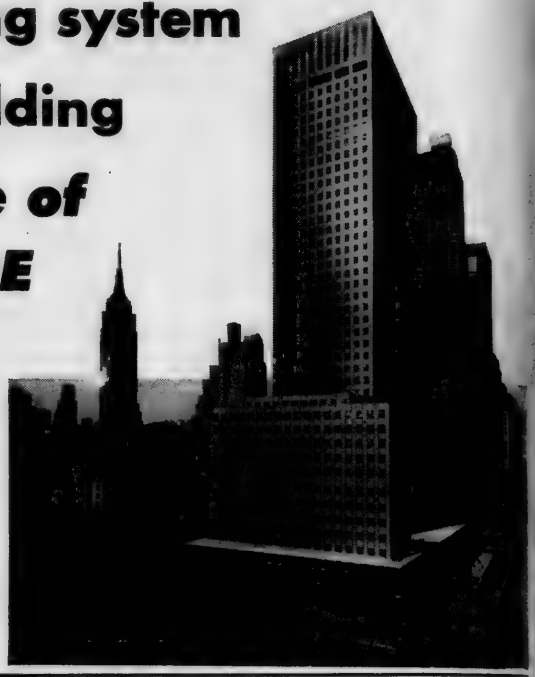
BUFFALO, N. Y.

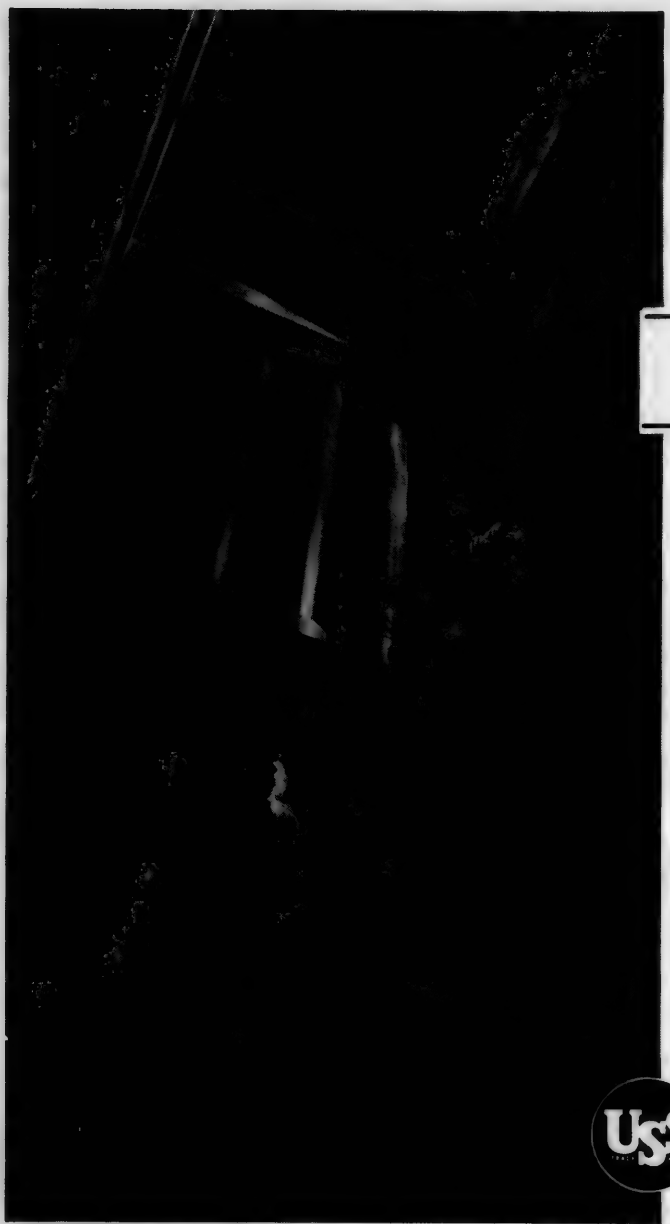
Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

Rugged construction clearly indicated in view of 66" Style "V" stack. Note ample heavy stack bracing and internal plate gussets to support heavy motor.

Right, showing raised hood of 42" Style "H" unit. Note rigid internal tubular frame in head, easy access to motor and neat appearance — units spray-coated both inside and outside with ⅛" thick cork impregnated fire and moisture resistant compound.

Ingenious air-conditioning system of Socony-Mobil Building *makes liberal use of* NATIONAL PIPE





Owner: GALBREATH CORP., JOHN W. GALBREATH AND PETER B. RUFFIN
Architects: HARRISON & ABRAMOVITZ
Associated Architect: JOHN B. PETERKIN
General Contractor: TURNER CONSTRUCTION COMPANY
Mechanical Engineers: JAROS, BAUM & BOLLES

This gleaming, 45-story, stainless-steel-sheathed building is the largest air-conditioned office building structure ever erected. Its remarkable air-conditioning system is powered by purchased steam, which is actually used twice. In the basement there is a refrigeration plant, consisting of 3 centrifugal steam turbine driven compressors of 2600-ton capacity. These 3 units are driven by steam turbines operating full condensing, with the exception of one which is a partial condensing and exhaust. This exhaust steam, by means of a 10-inch steam main, is tied in with the building's steam distribution system. This 10-inch main serves, during summer operation, all the steam requirements for the tempering coils in the air-conditioning system, as well as the steam required for three 500 Lithium Bromide Absorption Machines. In other words, the three 500-ton units act as a surface condenser for the exhaust steam—the building enjoying the economics of this ingenious piping layout.

Approximately 470 tons of USS NATIONAL Pipe—most of it Seamless—were used in the construction of the air-conditioning and heating systems. And at least 350 tons of NATIONAL Seamless were used in the huge building's plumbing system.

As is so often the case in designing complex plumbing and heating systems, the engineers selected NATIONAL PIPE. They knew from past experience that, no matter how rigorous the conditions, NATIONAL would do the job, and do it well.

If you'd like more information on the use of NATIONAL PIPE in plumbing and heating, air-conditioning and power installations—large or small, simple or complex—get in touch with us. Our experienced engineering staff is at your service.

USS

NATIONAL TUBE DIVISION, UNITED STATES STEEL CORPORATION, PITTSBURGH, PA.
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

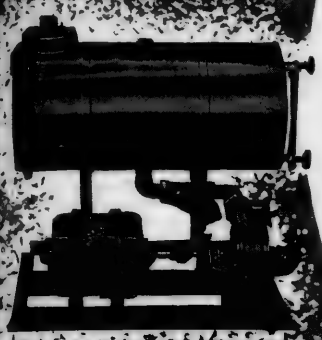
NATIONAL PIPE

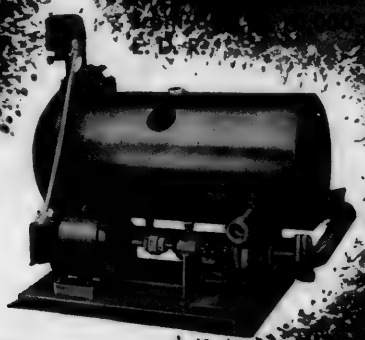
UNITED STATES STEEL

SPECIFY WITH CONFIDENCE

There's a Skidmore Pump designed for each and every heating requirement.

Write for bulletins





TYPE "TM"

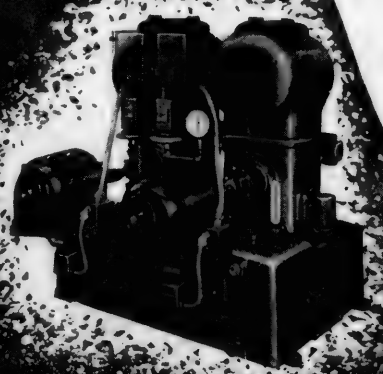
Completely assembled on either steel or cast iron base —capacities, for boilers up to 250 H.P., with discharge pressures to 150 lbs.

TYPE "HS"

Sturdily constructed for dependable service at small investment — capacities 1,000 to 65,000 sq. ft. E. D.R., discharge pressures from 10 to 75 lbs.

VACUUM TYPE

Automatically adjusts itself to the varying conditions of the system. Efficiency maintained. Capacities ranging from 5,000 to 100,000 sq. ft. E.D.R.



TYPE "UV"

Designed for low return installations — capacities, 2,000 to 40,000 sq. ft. E.D. R. and discharge pressures from 10 to 75 lbs.

IDMORE CORPORATION, ST. JOSEPH 5, MICHIGAN

se send bulletins on the following pumps checked below.

	TM	HS	UV	VACUUM
.....				
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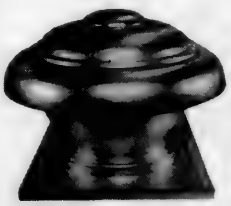
.....				
..... State.....				

Sound-Elec Test Chamber where every Jenn-Air Unit is tested.

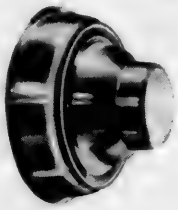
QUIET-TESTED EXHAUSTERS

"Given the Works" / BY JENN-AIR SOUND-ELEC TEST CHAMBER!

Only Jenn-Air Quiet-Tested Exhausters are pre-proved under simulated field conditions. Before leaving the factory, each unit must pass rigid inspection by the critical "Vibronic Eye" . . . each is screened in Jenn-Air's Sound-Elec Test Chamber to detect noise, vibration, and structural weakness. In Jenn-Air Exhausters, U-Springs suspend the power assembly—isolate it from the base of the unit. Motor and blade are balanced together, as a safeguard against vibration and noise. Result: the quietest exhausters on the market. How about maintenance cost? There is virtually no upkeep on Jenn-Air Exhausters. Installation is easy and inexpensive. Ball bearing motors are lubricated for 10 years of normal operation. Spun-aluminum, rust-proof exhausters never need painting.



Jenn-Air Low-contour Roof Exhausters, unlike most industrial-type ventilators, live in architectural harmony with modern roof lines.



Jenn-Air Wall Exhausters—architecturally-sculptured button design spots ventilation control.

JENN-AIR PRODUCTS COMPANY, INC.

1102 Stadium Drive • Indianapolis 7, Indiana

IRON FIREMAN MicroMist BURNER

TRADE MARK

check these facts

a reliable new method of firing low-cost heavy oils, including heavy No. 5

BURNS ANY GRADE OF FUEL OIL THROUGH HEAVIEST NO. 5
LOW FIRE NO-SMOKE START
FULL FLAME MODULATION
3 TO 25 GPH
New 2-stage atomizing principle reduces heavy oil to a microscopic mist
ELECTRIC (NOT GAS) IGNITION
INTEGRAL CONTROL PANEL
VERY LOW POWER CONSUMPTION

Why is it called the MicroMist *burner?*

The basic engineering advance used in the Iron Fireman MicroMist burner is a revolutionary new atomizing method. Heavy oils including *heavy* No. 5, are reduced to minute particles having the characteristics of a gas rather than a spray. The oil is so finely divided that it becomes an oil mist or fog that will remain in air suspension up to 24 hours or longer.

The heart of the Iron Fireman MicroMist burner is an ingenious supercharger, or compressor. The oil is mechanically atomized, as oil and air pass into the compressor. Such mechanical atomization is as far as other burners go. But in the revolutionary MircoMist burner, the compressor-atomizer further reduces the oil spray, by heat of compression, to a microscopic air-oil vapor.

This highly combustible vapor (which is easily ignited by an electric spark) is directed into the firebox by the nozzle. Unlike other oil burners, the nozzle is *not* a critical part, because it has nothing to do with atomization. There are no small passages subject to clogging. Heating of oil is required only for the heavier grades of No. 5, and then only for starting or pumping. The power load is exceptionally low. Extremely precise modulation is achieved through a variable volume pump.

Look at these additional features

The Iron Fireman MicroMist burner is as easily installed as a conventional gun type burner. It has two important uses: as a conversion burner or as a component part of a packaged boiler-burner unit. No special boiler front or boiler pitting is required. The choice of oil grades is almost unlimited. Integral control panel is wired and tested at the factory. Fuel and maintenance costs are low. It fires low-cost heavy oils with little more attention than a domestic oil burner. Available for low fire start, high-low or modulating firing.

IRON FIREMAN.

AUTOMATIC FIRING EQUIPMENT FOR OIL, GAS, COAL

SEND FOR MORE INFORMATION

IRON FIREMAN MANUFACTURING COMPANY
3349 W. 106th St., Cleveland 11, Ohio.
(In Canada, 80 Ward Street, Toronto, Ontario.)

Please send more information and specifications on the Iron Fireman MicroMist burner.

Name_____
Firm_____
Address_____
City_____ Zone____ State_____

lowest capital outlay for complete hot underground pipe protection

TRI-SUL-ITE

3-WAY PROTECTION SYSTEM

Yes, a *single, adhering* material, TRI-SUL-ITE, provides complete 3-way protection for hot underground pipes.

TRI-SUL-ITE is a specially selected, high quality Gilsonite. You pour and work it around and under the pipes, then lightly tamp. Simple curing by proper pipe heat converts TRI-SUL-ITE into an efficient 3-zone protective barrier against water, corrosion and heat loss.

ZONE 1, adjacent to and adhering to the pipe, consists of completely fused TRI-SUL-ITE. This zone is a permanent water barrier. It prevents water from following the grade of the pipe.

ZONE 2 consists of partially fused TRI-SUL-ITE granules—an efficient insulator.

ZONE 3 consists of unfused TRI-SUL-ITE granules. This zone resists water penetration, and is an excellent insulator. It also cushions shocks and stresses.

TRI-SUL-ITE is readily adaptable to future pipe changes. Old material can be quickly removed and new material installed as simply as before, without jeopardizing the original installation.

Write for brochure and installation procedures to Department A.

G. S. ZIEGLER & COMPANY

GENERAL OFFICES

GREAT NECK, N. Y.

ZICO

Beardsley Terrace Housing, Bridgeport, Conn. • Engineers: Frederick M. Hill and Paul D. Harrigan, New Haven.
Architects: Lindsay & Johnson, Bridgeport. • Heating Contractor: Bridgeport Pipe & Engineering Co., Bridgeport. • General Contractor: E & F Construction Co., Bridgeport.

Here's why Mechanical Engineer is **enthusiastic about Sarcotherm in 1200-family 16-building project**

AS Mechanical Engineer Paul D. Harrigan writes, "Sarcotherm steam heating controls in Beardsley Terrace Housing...working perfectly through extreme part of Winter as well as in Spring...sensitive, accurate and flexible...the Housing Authority, the architects and we ourselves are entirely satisfied."

Sixteen Sarcotherm Weather-Compensated Controls serve Beardsley Terrace. Of the continuous, modulated flow design, they provide individual zone control for the steam heating of each building. Precisely engineered orifice plates assure the proper steam flow to each heating unit.

COMPLETE SYSTEM — UNDIVIDED RESPONSIBILITY

Sarcotherm engineers cooperate in the preparation of working drawings and wiring diagrams for each job, and follow through with on-the-job help and supervision of installation.

Sarcotherm assumes undivided responsibility because the Sarcotherm System is COMPLETE—includes zone controls, panels, thermostats and steam specialties—traps, valves, and air eliminators.

Write for further details. Sarcotherm Controls, Inc., Empire State Building, New York 1, N. Y.

FEATURES OF SARCOTHERM CONTROL SYSTEMS

1. **Easy to install**—working drawings and wiring diagrams furnished for each job.
2. **Easy to maintain**—because of simplified construction, fewer parts.
3. **Easy to adjust**—to any desired setting.
4. **Engineered orificing**—assures even heat flow to all units from the start.
5. **Undivided responsibility**—by one maker, Sarcotherm, for the complete control system.

4003-B

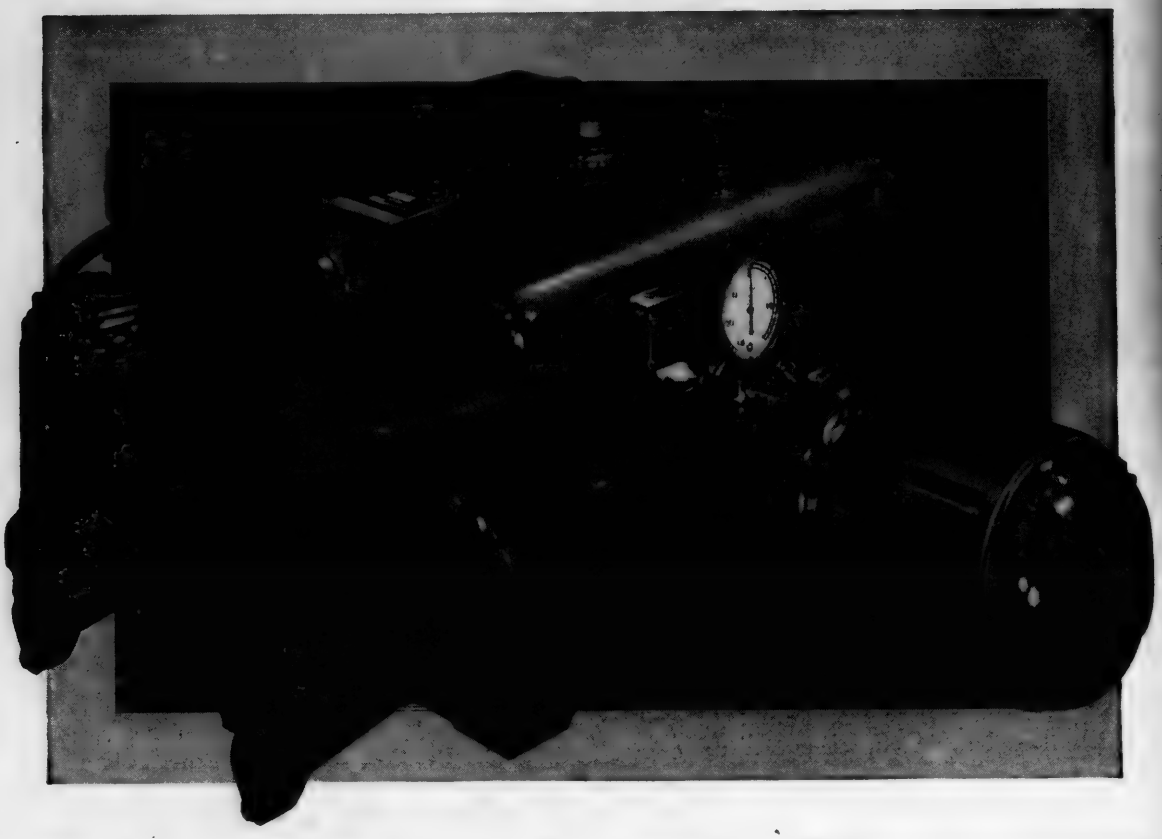
Sarcotherm

An affiliate of SARCO COMPANY, INC.

WEATHER-COMPENSATED CONTROLS FOR **STEAM, HOT WATER AND RADIANT** *HEATING*

THIS NEW VACUUM HEATING PUMP

HAS THE INCREASED AIR CAPACITY EFFICIENT HEATING PRACTICE DEMANDS



It's the Nash CSM

Designed and manufactured by the organization that made the Jennings Manifold Heating Pump standard of the Heating Industry, the new CSM incorporates every desirable feature architects, engineers, owners and operators have sought. Employing separate air and water pump elements, each with its own motor and each independently controlled by its own automatic switch, the capacities and arrangement may be widely varied to meet job conditions. For the first time, the engineer has the choice of realistic water and air capacities required for rapid system response without wasteful overheating.

These pumps possess many other features which permit a more efficient utilization of fuel and minimum use of electric power. Low, low returns reduce installation costs and usually eliminate putting the pump in a pit. Simplicity and efficient operation reduce supervision and maintenance costs. Information regarding this new heating pump development is available immediately upon request.

- Increased air capacity induces rapid system response without wasteful overheating.
- Separate air and water pumps individually selected to meet actual job requirements.
- Control system that operates individual pumps only when needed.
- Flexibility permitting addition of radiation without changing basic pump installation.
- Low, low, return line connection.

NASH ENGINEERING COMPANY

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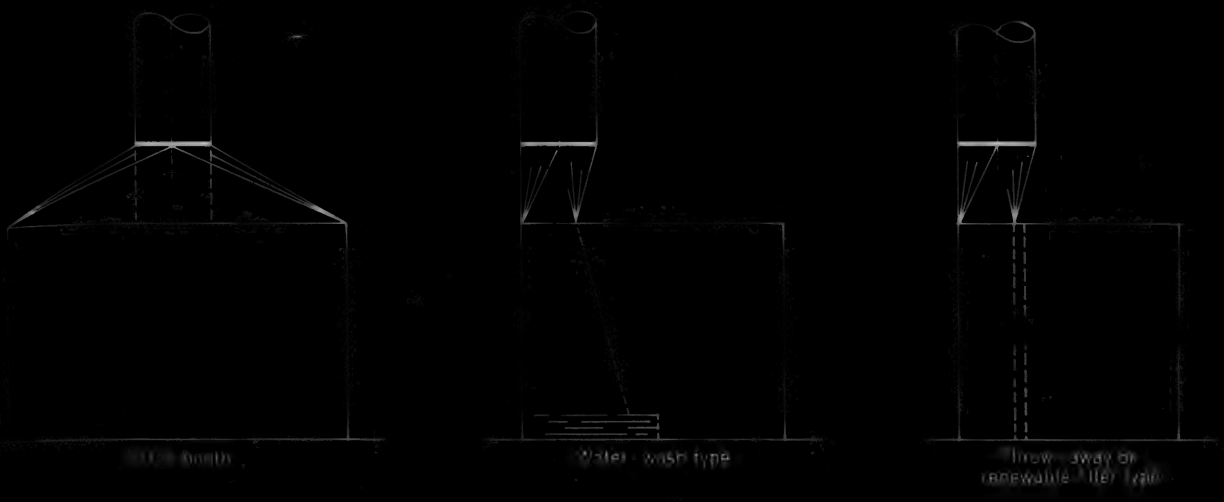

Ventilation for Spray Painting

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A concise presentation of the various phases of ventilation design to be considered in protecting workers engaged in spray painting. Points covered are volume of air to be exhausted, control velocity, shape of enclosure, air distribution, air cleaning and protective equipment, and fan selection. Basic booth designs are illustrated.

VENTILATION of spray paint coating operations is essentially designed to remove the various paint constituents which are not deposited on the parts being coated. Most important of these are the solvent vapors which are usually both toxic and flammable. Pigment particles are also significant from the point of view of cleanliness and fire hazard control. Successful ventilation control for such an application includes protection of the workers on the job, a satisfactory product, inplant cleanliness and the elimination of any potential neighborhood pollution problems which may be attributed to solvent vapor odors or the deposition of paint on neighboring property.

Thinners used for different paint compositions exhibit various degrees of toxicity and, unless controlled, can seriously endanger the health of workers on the job. Ventilation requirements, in terms of health, are so stringent that, when maintained, the hazard due to explosibility of solvent-air mixtures is eliminated. For example, the maximum allowable concentration of toluene in air based on an eight-hour working day is 200 parts per million or 0.02%. The explosive limit range, as expressed in lower and upper explosive limit values, is 1.27 to 7.0%; these values being far in excess of the health limit or MAC for toluene. The same relationship holds true for practically all of the flammable paint solvents.

Ventilation Design

Paint coating operations cannot be done haphazardly in any section of the plant but must be properly located and adequately controlled. In terms of job location, the paint coating operations should naturally be suited to the production scheme but whether it be a simple brush coating procedure or an automatic spraying operation, ventilation control is required. The spray booths commonly used in industry vary from the self-made type consisting of a rectangular enclosure and a propeller type fan mounted in the rear panel to the manufactured type which may include water wash, throw-away type filters or simple baffles for collecting overspray. In any case the following factors should be considered in spray booth design.

Air Volume to be Exhausted

The basic criteria in spray booth design is the exhaust volume which is usually a function of booth size and operation characteristics and which governs the success or failure of the operation. A properly selected exhaust volume not only serves to dilute the solvent vapors given off, but also has a direct bearing not only on the control velocities maintained in the booth, but also on all of the other related items such as the fan, the ductwork, the number of air filters required, motor horsepower, building heat loss and air supply requirements. All of these

Cut-away view of water wash paint spray booth. Courtesy, the DeVilbiss Company.

items are important and directly affect ventilation control, operation costs and the quality of the product. Having arrived at the optimum booth size and having minimized all openings such as silhouette openings to accommodate conveyor lines, the air volume is then arrived at based upon the control velocity to be maintained. In most cases, this control velocity will vary from 100 to 150 fpm and the air volume is calculated on the basis of the simple equation:

$$Q=VA$$

where Q is the exhaust volume expressed in cubic feet per minute, V is the control velocity expressed in feet per minute and A is the cross sectional area or booth face area over which control is to be maintained. The same formula is applied to all other openings where air may enter the booth when the rate of air flow per opening is to be determined.

In the case of the unusually large booth where large parts are sprayed, the air volume may be based on a control velocity figure as low as 75 fpm. This figure may be applied to very large booths. Since there is a large air mass moving into the hood, the contaminant is under the influence of the hood for a much longer time than with small hoods and the large air volume results in a greater dilution effect.

Control Velocity

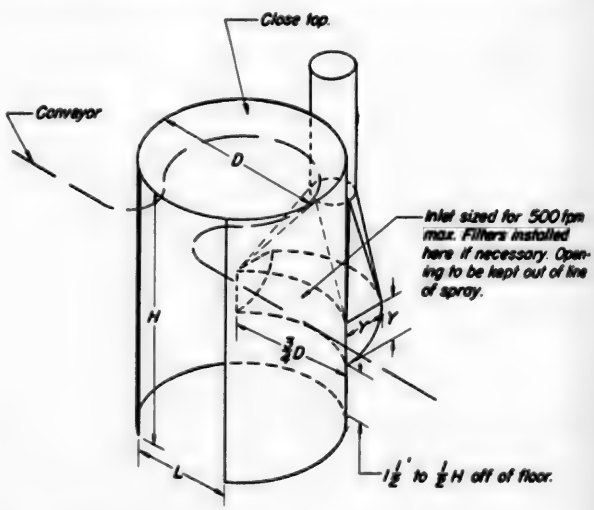
The control velocity, sometimes referred to as the capture velocity, is a velocity at any point at the hood face or in the hood where the contaminant is captured by virtue of the air flow. In general, a face or control velocity of 150 fpm is required for the small bench type booths and a velocity of 100-150 fpm with a larger booth. Of significance in the use of larger booths, is whether the operator works inside or at the face of the booth. From the point of view of control, it is preferable that the spraying take place inside the booth and, accordingly, the control velocity required may be less than if the spraying is done at the booth face.

The electrostatic paint coating techniques (which utilizes either spray gun, rotating bell or rotating disk for paint distribution as well as a charged field which imparts an electrostatic charge to the paint particles) has at times posed a problem in ventilation design since there was fear that air velocities as high as 100 fpm would disturb the coating process. Also there have been indications that the electrostatic process is so effective that there is little paint loss or overspray and no need for ventilation control. The latter supposition is decidedly incorrect. Despite the effectiveness of the process, there are still solvent vapors to be captured and experience has indicated that a minimum control velocity of 100 fpm is not only necessary but will have no adverse effects on the operation.

One procedure for increasing face velocity in an existing booth, is to cut down on the net area of the face opening. Frequently in booths that are oversized, where the operation does not warrant the use of a large face opening, and where an increase in a face velocity will result in more effective control, it is good practice to cut down on the face opening with the use of side baffles which may be removed or opened if future requirements necessitate the full face area.

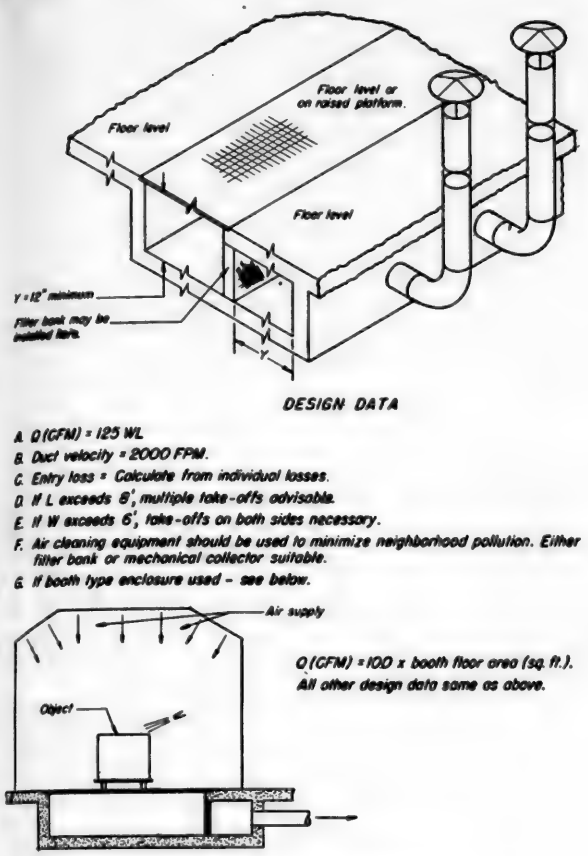
Shape of Enclosure

The shape and size of the booth enclosure is affected by the production procedure but should be such that satisfactory control velocities and proper air distribution are maintained at all times. The size of the booth should


Close top.
Conveyor
D
Inlet sized for 500 fpm max. Filters installed here if necessary. Opening to be kept out of line of spray.
H
3/4 D
L
1½" to ½ H off of floor.

Face inlet velocity = 100 fpm maximum.
Q (volume) = 100 HL or 50 DH, whichever is higher.
Duct velocity = 2000 fpm.
Entry loss = 0.25 duct VP plus filter loss.

Exhausted enclosure for electrostatic spray system.


Floor level or on raised platform.
Floor level
Floor level
Y = 12" minimum
Filter bank may be installed here.
DESIGN DATA
A. Q (CFM) = 125 WL
B. Duct velocity = 2000 FPM.
C. Entry loss = Calculate from individual losses.
D. If L exceeds 8', multiple take-offs advisable.
E. If W exceeds 6', take-offs on both sides necessary.
F. Air cleaning equipment should be used to minimize neighborhood pollution. Either filter bank or mechanical collector suitable.
G. If booth type enclosure used – see below.
Air supply
Q (CFM) = 100 x booth floor area (sq. ft.).
All other design data same as above.
Object

Downdraft spray paint ventilation.

be governed by the process and should be no larger than necessary since the larger the face opening, the larger the volume of air required for control. If side openings or slits are necessary to accommodate a conveyorized system, these openings should be as small as possible and the design exhaust volume should also include the volume of air exhausted into these openings. It is poor practice to locate the conveyor directly in front of the booth face if there is any possibility of running the line directly through the body of the booth enclosure since the latter will enable spraying in the booth proper and accordingly permit lower design control velocity. The booth structure should be designed for easy maintenance since paint spraying operations create many housekeeping problems.

Air Distribution in Booth

It is important that the ventilation enclosure be designed so that there is a well balanced distribution of air across the entire booth face. Good distribution is easily accomplished in the average sized booth where the source of suction is centered in the rear panel of the enclosure and where there are little or no limitations on air access to the booth. Regardless of the location of the exhaust take-off, effective air distribution is necessary for control and this can be accomplished with the use of baffles, properly placed renewable or throw-away type filters or specific hood shape characteristics. A factor which has a significant effect on air distribution but which is sometimes neglected, is the booth location in terms of air entry. If the booth is located against a wall, in a corner of a workroom or in an area where strong cross-drafts exist or in a stock pile area, a distorted entry pattern may develop despite proper design of the exhaust equipment. If this occurs and satisfactory distribution cannot be maintained, it is often best to change the booth location or provide a direct air supply.

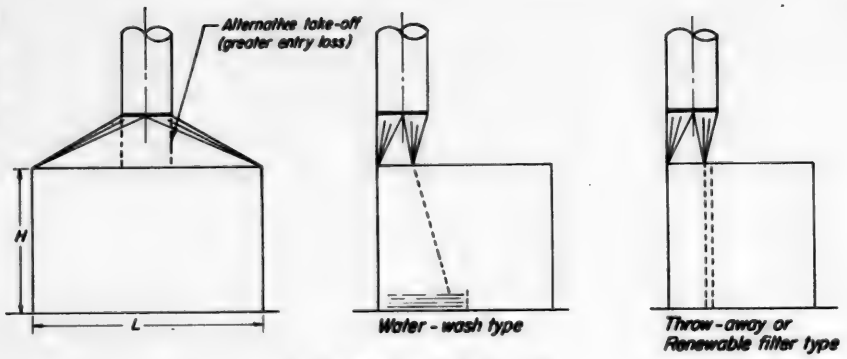
Air Cleaning Equipment

Probably the water wash booth is the most familiar type of manufactured spray booth system. This water wash equipment serves as an air cleaner as well as an exhaust system and removes the contaminants given off during the painting process. This type cleaning system is effective with particulate material and also reduces the solvent vapor emission. Various types of satisfactory water wash booth equipment are available, using various arrangements for recirculating the water, washing the air and eliminating the moisture.

Within recent years the disposable type filter unit has been used to a greater extent for air cleaning purposes in spray booth installations. The throw-away type filter is mounted in frame sections usually along the rear panel section of the booth. These filters serve to remove the particulate contaminants before they pass through the fan and ductwork to the outside, thereby minimizing the maintenance problems associated with cleaning fans and ductwork and eliminating neighborhood air pollution problems attributable to pigment emission in the area of the plant. As in any type booth, it is important that the bank of throw-away filters be properly sized to accommodate the correct air flow and the location of the filter bank is critical in terms of air distribution. There has been some criticism directed at the throw-away filters because of a suspected fire hazard created by the collection of a flammable type material in one location of the booth. However, it is generally recognized that air filters having a combustibility not in excess of Class 2 as listed by Underwriters Laboratories, Inc., will meet most insurance company and fire agency requirements. It should also be noted here that it is much more satisfactory from the fire hazard point of view to use either the water wash type or the filter bank type air cleaning equipment than to neglect this control aspect and allow paint to collect on the interior of the ductwork and fan equipment. The latter condition usually results in a severe maintenance problem and can cause destructive and costly fires, to say nothing of the possibility of neighborhood air pollution complaints. The disposable type filters present an operational problem in that direct spray coats or plugs the surface of the filters resulting in increased resistance to air flow. It is, therefore, important that the filters be replaced as often as is necessary in order that proper air flow be maintained. Some users of this type of equipment have found that the use of offset baffles, located in front of the filter bank, serves to collect much of the paint overspray, prolonging filter life. Despite the maintenance necessitated by the use of the disposable type filters, many plants have found this to be a practical means of operation even with production type spray systems.

Wet collectors have been successfully applied to paint spray exhaust systems in place of either filters or the directly connected water wash type equipment. If used, the collector should be placed as close to the booth as pos-

Typical spray booths showing details for the large booth and also for the bench type booth.



LARGE BOOTH

Q(cfm) = 125 x HL (operator inside)
150 x HL (operator at booth face)
Duct velocity = 2000 fpm
Entry loss = Water wash -- check manufacturers specifications.
Filter type -- 0.25 - 0.50 duct VP (depending upon transition angle. see Fig. 6-5) plus filter loss. (see manufacturers specifications)

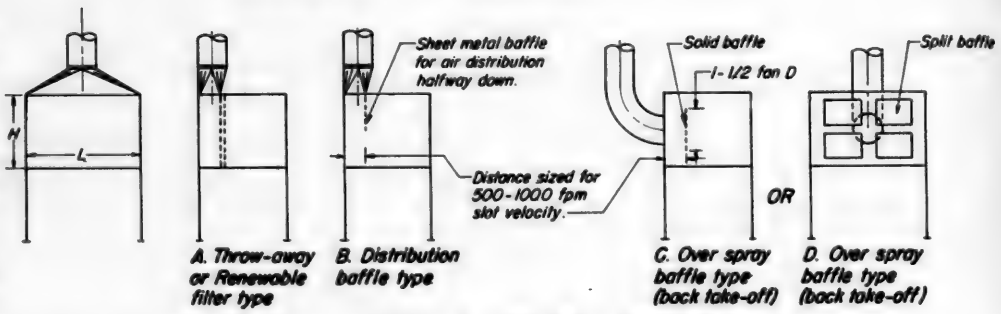
Notes

Face velocity may be reduced to minimum of 75 fpm in the case of extremely large booths where large directional air mass is being handled. Operator to wear Bureau of Mines approved respirator.

Respirator to be worn wherever excessive spray rebound takes place.

Insurance underwriter should be consulted concerning use of filters.

Use explosion proof lighting fixtures and fan.


H
L
Sheet metal baffle for air distribution halfway down.
Distance sized for 500 - 1000 fpm slot velocity.
Solid baffle
1 - 1/2 fan D
OR
Split baffle
A. Throw-away or Renewable filter type
B. Distribution baffle type
C. Over spray baffle type (back take-off)
D. Over spray baffle type (back take-off)

SMALL BENCH TYPE BOOTH

Q(cfm) = 150 x HL
Duct velocity = 2000 fpm
Entry loss = A. 0.25 - 0.50 duct VP (depending upon transition angle. see Fig. 6-5) plus filter loss (see manufacturers specifications)
B. 0.25 - 0.50 duct VP plus 1.78 slot VP.
C. 0.25 - 0.50 duct VP plus 1.78 slot VP.
D. 0.25 - 0.50 duct VP plus 1.78 slot VP.

sible so as to minimize ductwork contamination and the subsequent maintenance required.

Frequently, the poorly designed spray booth is typified by a simple rectangular enclosure with an axial flow fan centered in the rear section of the booth. During the spraying process, overspray readily coats the fan blades cutting down on fan efficency and the air volume exhausted. If it is necessary to continue the use of this type booth, it is good practice to locate a sheet metal baffle about 12 in. in front of the fan opening, thereby reducing the amount of overspray that reaches the blades.

Fan Selection and Duct Design

The fan selected for use with the spray booth system should be selected on the basis of the air volume to be exhausted and the static pressure resistance of the system. The static pressure resistance of the fan, although frequently neglected in specifying fans for this type service, is particularly important inasmuch as it governs the volume of air being exhausted. Whether the booth be of the simplest type directly exhausted to the outside through the wall of the building or whether it be a complete water wash type unit, it is important that both the air volume to be exhausted and the static pressure resistance of the system be determined and specified when ordering fan equipment. A simple baffle or one elbow in the connecting duct system or any other fitting imparts resistance to air flow and effects static presure resistance calculations. A fan selected to exhaust 10,000 cfm at free delivery may only exhaust 5,000 cfm at $\frac{1}{8}$ in. static pressure. This static pressure, $\frac{1}{8}$ in. of water, is a minimum figure for the simplest of systems. The ductwork should be properly sized and designed to accommodate air at a minimum resistance with all fittings constructed and installed in accordance with good sheet metal practice. A weather cap, if used, should be properly designed so as to impart a minimum resistance to air flow. A close fitting, poorly designed cap acts as an effective throttle.

All paint spray operations should be exhausted to the outside and above roof level so as to eliminate the possibility of contaminated air being reintroduced back into the workroom through building openings.

Make Up Air

It is good practice to provide make up air in quantities equal to the total volume exhausted at controlled operations whenever the amount of exhaust ventilation exceeds three air changes per hour. This poses a problem in most plants where spray painting is done because the volumes of air exhausted are fairly high and a negative pressure can easily be developed in the plant during the cold weather months when windows and doors are normally closed. Such a pressure handicaps the heating equipment in the plant by virtue of cold drafts which are introduced through cracks in windows and doors and imposes an increased static pressure resistance on all of the existing ventilation systems. The latter is particularly serious in those systems utilizing propeller type fans which tend to exhibit a rapid fall off in the volume of air handled with even a slight increase in static pressure resistance. Another result of the negative pressure condition in the plant is the effect on the operation of natural stacks such as those on fuel burning equipment. Frequently, an indraft is created with products of combustion being discharged directly into the workroom rather than to the outside, creating a hazard by virtue of the build up of carbon monoxide.

Make-up air, when introduced, should be tempered and preferably filtered. Filtering is particularly important at those coating operations where high quality control is being maintained and where particulate matter on the surface of the parts being coated cannot be tolerated. It is often advantageous to locate the inlet of such supply air systems at a point as remote from the exhausted operation as possible so that there are no high velocity drafts directed toward the spray booth and the tempered supply air can be used for providing general ventilation in other plant areas before being exhausted to the outside.

A filter system should be used in conjunction with the make-up air supply system and the process itself should dictate whether all air entering the spray booth should be filtered immediately before entry.

Respiratory Protective Equipment

Good ventilation design should serve to eliminate the need for respiratory protective devices such as organic vapor respirators or supplied air hoods. However, in certain types of spraying operations where large parts are being coated and an excessive amount of rebound takes place, it is important that such respiratory protective equipment be used. The Bureau of Mines issues approval on most types of respiratory equipment and it is important that this approval be specified when considering such items.

Wiring

It is important that the exhaust equipment be in operation whenever spraying is being done. Control of the spray apparatus should be so arranged that the spray cannot be applied unless exhaust fans are in operation.

Also, when filters are used, it is important that an effective maintenance program be carried on so as to eliminate the possibility of plugging and a decreased exhaust volume. A differential pressure manometer can be used to advantage for indicating filter resistance and plugging.

Explosion proof wiring and equipment shall be used in all spray booth installations. Additional information on the subject of wiring can be obtained by referring to the Standards for Spray Finishing No. 33, published by the National Fire Protection Association.

The Meaning of Boiler Efficiency

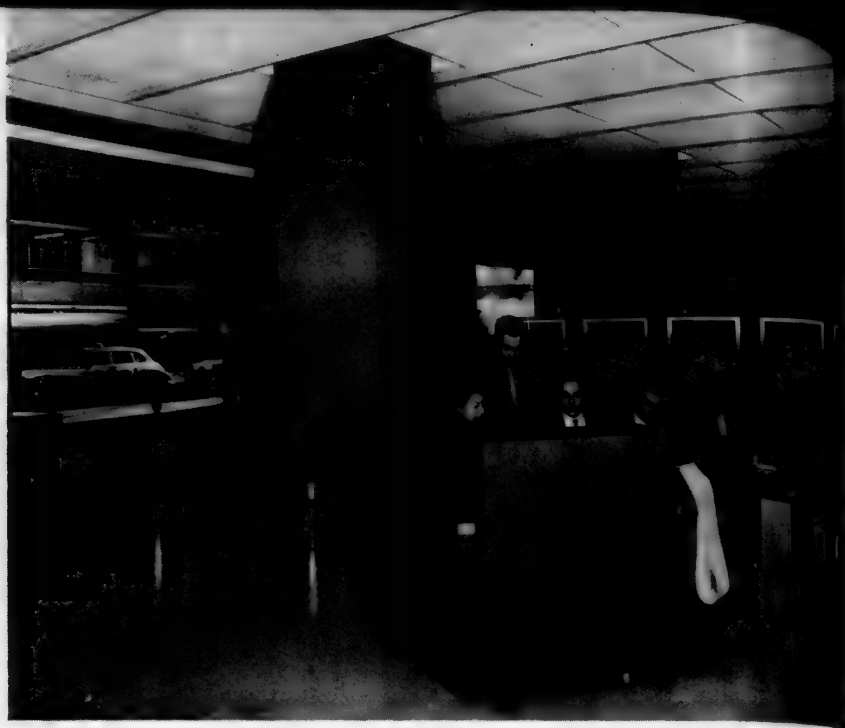
There is no area in which there is more loose thinking than the subject of boiler efficiencies when they are used for the prediction of yearly fuel consumption, according to the Bituminous Coal Institute. BCI engineers are confronted continuously with the claims of absurdly high efficiencies of those who are promoting competitive fuels. Many consulting engineers and architects substantiate their statements by quoting all sorts of authorities and manufacturers' guarantees.

The first step in solving such arguments simply consists of a clear understanding of terminology. The term "boiler efficiency" is used in a number of different senses. For the prediction of fuel consumption the only correct efficiency to use is the average operational efficiency. In the case of a heating plant, data should be taken over a whole heating season; the average efficiency calculated in this manner is called "seasonal efficiency." In case of a plant with a process load the period over which the average efficiency should be determined depends on the variation of load at various times of the year. Where the load cycle is the same throughout the year, a weekly or monthly period may be sufficient.

Normally, the larger manufacturing plants with a process load are well metered and information on average operational efficiencies for such plants is available, although not plentiful. Unfortunately, however, data on seasonal efficiencies for heating plants in the size range from 30 to 500 nominal boiler horsepower is practically non-existent. As a result, many engineers in an effort to make estimates of fuel consumption use boiler efficiencies which are really "boiler test efficiencies."

There is a significant difference between the test efficiency and the seasonal efficiency of a boiler plant. The test efficiency of a boiler is obtained under strictly controlled conditions. Such tests are usually run in the following manner: The boiler is cleaned on both the fireside and the water-side and run for at least 24 hours on the fuel used. The boiler is put on the pre-determined load, usually its rated capacity, for several hours before readings are taken. During this tune-up period, the air/fuel ratio is adjusted to give maximum efficiency. During the test, the load is held constant, and operation is strictly controlled to obtain maximum efficiency. Under these conditions, there is no problem to get design efficiencies of 75% to 80% for any fuel and load conditions. Efficiency curves shown in the catalogs of several oil or gas-fired package boilers are based upon such tests. They show high efficiencies over a load range from 50% to 100% of rated boiler capacity.

No heating or industrial boiler ever runs under such strictly controlled conditions for there are indeterminable amounts of heat lost. These may be from the heating unit, the distribution system, and the flue pipe, from standby operation of the unit and from faulty operation.



Straightline type air diffusers serve this large room which houses a number of electronic computers. Vanes on diffusers eliminate possible drafts.

Electronic Computer Requires Large Cooling Air Supply

A carefully planned air delivery through straightline air diffusers permits an air change per minute in IBM room.

TREMENDOUS amounts of air are required to cool a single, large electronic brain or computer. For example, the IBM 705—generates more heat than 750 persons and the room air must be completely changed once every minute.

The 705, with its auxiliary units, quartered on the first floor of the IBM World Headquarters Building in New York City. The various units of the machine are electronically interconnected by cables. The unit can handle problems from routine accounting to those dealing with stress and vibration analysis.

In the 705 Room, an aluminum eggcrate ceiling filters fluorescent light into the room from a solid bank of tubes above. A row of incandescent spots in a ceiling panel adds more light, and two troughs, running the length on either side of the 102 ft x 43 ft room, contain more incandescent spots which furnish indirect lighting. The back wall of the room is painted brilliant red, with signs in raised letters.

Humidity and temperature control are necessary to prolong the life of certain components of the machines. Cellulose acetate base magnetic tape further requires that the relative humidity be maintained between 40 and 60%. The machine develops a heat gain of 375,106 Btu; the lighting and sun load add 282,955 Btu. This adds up to more than half a million Btu. The average six-room house develops 42,000 Btu, with roughly three times the floor area of the 705 room.

An independent, specially engineered air conditioning system provides the climatic conditions required by the electronic brain and its auxiliary units. A number of unusual problems had to be met in designing this system. Since the 705 Room was planned as an exhibit space as well as an office, the air conditioning system could not conflict with the architectural design of the room. The large heat load called for 65 air changes per hour, which posed the problem of moving a tremendous amount of air without causing strong drafts on the occupants of the room.

Distribution of Air

A total of 26,000 cu ft of air is brought into the room each minute. Of this amount, 10,000 cu ft are injected through a single Anemostat straight-line diffuser 60 ft long, running almost the entire length of the room on the vertical side of a soffit in the ceiling. This diffuser taps on to the supply duct through ten 6 ft plenums butted together. Between the structural columns separating the windows are six more straight-line diffusers, each about 17 ft long, set horizontally and running parallel to the windows. These diffusers supply another 6,000 cfm of air. The remainder is blown directly into eight units of the machine, through holes in the floor. The heat gain of these units varies from slightly more than 5,000 Btu to 17,400 Btu. As much air as possible was supplied in this way.

Had there been more units to the machine, the problem of drafts could have been easily solved by injecting all the required air supply directly into the units. The units themselves would have slowed down the air considerably, and the heat that would have been added to the air would

have lessened the effect of what drafts there were. But this couldn't be done for two simple engineering reasons: (1) space was lacking to accomplish the desired result, and (2) which is more important, temperature and humidity limitations on this direct-feed air would require even greater volumes of air to be introduced for the necessary cooling.

Since units of the electronic brains generate more heat than can be handled in this ingenious fashion, other ways of avoiding drafts were used. The principal one is the aspirating diffuser. One part of supply air and one part of room air are mixed in the diffuser, so that the temperature of the supply air is raised by the time the air is brought into the room, to provide draftless diffusion.

The use of one big diffuser was decided on for two reasons: (1) it blended into the architectural design of the room, and (2) it allowed the introduction of a large amount of air into a relatively small area, a difficult task under most conditions for the usual types of diffusers.

The direction of the supply air had to be carefully planned. The 60 ft diffuser blows the air out into the room on a horizontal plane just below the ceiling. As the air moves out, its velocity gradually decreases. It is cooler than the room air so it tends to flow downward, and at the same time its temperature rises. Vanes on the diffusers near the windows cause this air to be directed horizontally. The air begins to fall just before it reaches the soffit, directly in front of the machine area proper. The decreased velocity of the flowing air and its rising temperature eliminates discomfort from drafts.

Diffusers running the full length of the room, complement the dignity of the architectural design. Light troughs run the length of the room on either side to serve as exhaust intakes as well as recesses for incandescent spots. Eight duct taps on each side provide access to the return ducts.

There is some leeway in the theoretical operating temperature required for the electronic brains, the maximum being about 80 deg F; 75 deg was chosen for the 705 Room, with consideration being given to the room occupants. The degree of variation from the established normal temperature is of equal importance. Prevention of a rapid temperature fluctuation of more than a few degrees is usually desirable. The supply air is brought into the room at 55 deg, 90% relative humidity, and 52 deg dewpoint. When the supply air is mixed with the room air in the diffusers, the result is air at 65 deg, 65% relative humidity, and 54 deg dewpoint. Air entering the machine quickly goes to 90 deg, necessitating the high air change rate.

Compressors and air handling equipment for the system are in the basement of the building. Two cooling tower pumps, three chilled-water pumps, and three compressors were installed. The fan used is of much heavier design than was required. All moving parts in the system were examined for possibilities of duplication.

Corrosive Action of Water on Heaters

Corrosion results from flow of an imposed or self-induced electric current and causes conversion of metal to a compound. It is thus an electrochemical process which involves destruction of metal. There are at least two paths required for the current flow associated with corrosion. One path is the metal; it permits electrons to flow from areas of high potential (anodes) to areas of low potential (cathodes). The second path is some liquid capable of permitting ions to flow through it. Electrons do not flow through the second path. The second path is in effect the corrosive medium which surrounds and touches the surface of the metal. In the case of water heaters it is the hot water contained within the tank.

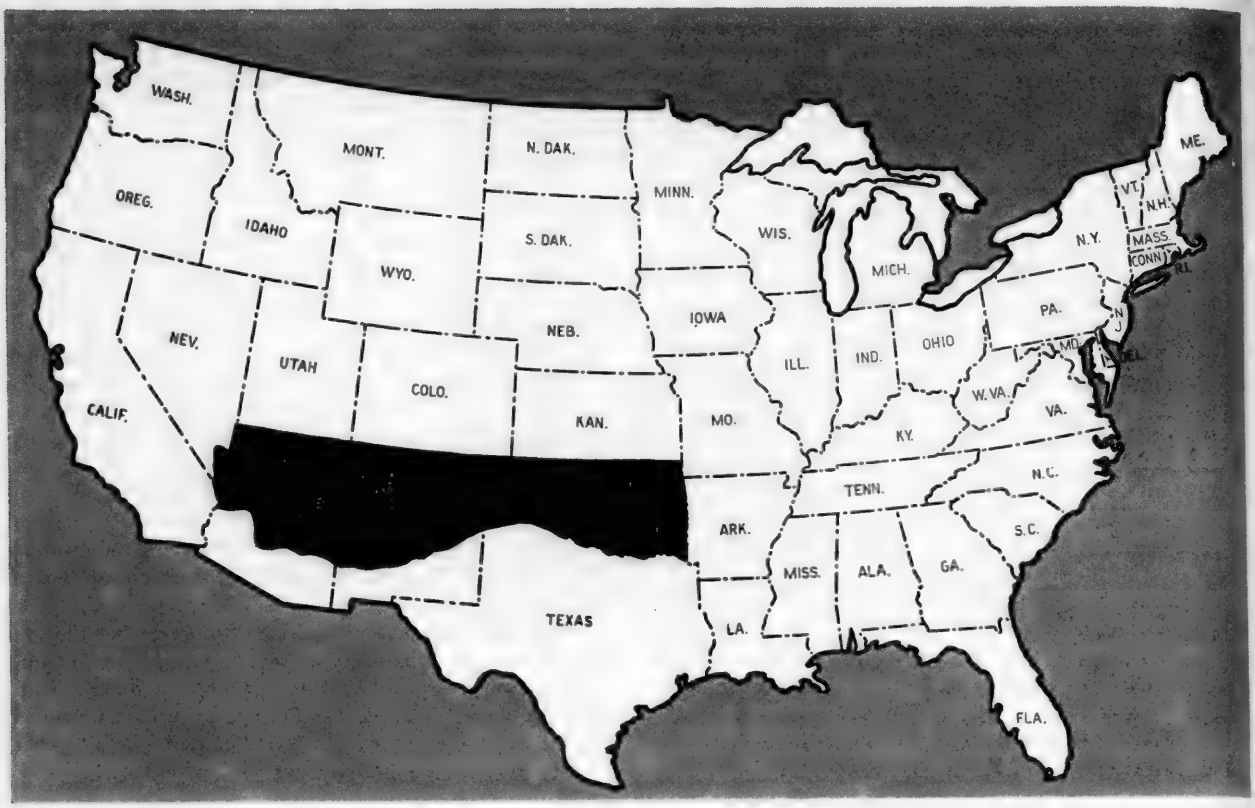
Since resistance to flow of electrons is essentially the same for all ferrous alloys used to construct hot water tanks, it necessarily follows that the corrosion rate of the tank metal is not controlled by the ease with which electrons travel through the metal. Rather, the corrosion rate is controlled by the water. Anything which alters the chemical characteristic of the water, which changes the ease with which water can react with the metal or which alters the frequency with which certain ingredients in the water pass over a given spot on the metal, will influence the corrosion rate of the metal.

The composition of natural waters has interested many persons over extensive periods of time. As a result of this interest, considerable information has been learned which aids in understanding the behavior of water as a corrosive substance. Corrosiveness of a water is that property which makes the water aggressive to metal surfaces and frequently results in red water caused by solution of iron, although all red water troubles may not be a result of corrosion. Many well waters contain considerable quantities of iron in solution. When water from these sources is exposed to air, the iron separates out as a red precipitate.

The probable active agents in water aside from the solvent action of water itself are acids, salts which hydrolyze to produce acids, dissolved oxygen, carbon dioxide and hydrogen sulfide. The problem of corrosion prevention, therefore, is a problem of controlling certain active agents or at least reducing their effects.

All natural waters contain dissolved mineral matter. The quantity of mineral matter dissolved in a water depends primarily on the types of rocks and soils with which the water comes in contact and the length of the contact. Some streams are fed by both run off and ground water from springs and seeps. Such streams reflect the chemical character of the ground water during dry periods but are quite variable in composition during periods of heavy rains. Since ground water usually contains more dissolved mineral matter than does run off water, it follows that streams fed by both these sources will be more concentrated during seasons of little or no rainfall.

This information is from an American Gas Association report on Effect of Certain Variables on Corrosion of Gas-fired Domestic Water Heaters.



Calculating the Heat Requirements of a Snow Melting System

Part 7 — Southwest Region

WILLIAM P. CHAPMAN

This is the seventh article of a series which will eventually cover all parts of the U.S. where snow melting systems are likely to be used. The first article summarized the basic equation for heat required for snow melting and defined the free area ratio as the ratio of slab area free of snow to total slab area. In order that each installment of this series can be understood, both the classification of systems and the explanation of the four tables are repeated.

THE total heat output of a snow melting system depends on the rate at which it melts the snow, and this rate in turn depends on the relative importance of rapid snow removal among the different types of applications. Snow melting systems can be classified as follows:

Class I (minimum): Residential walks or driveways and interplant areaways;

Class II (moderate): Commercial (stores and offices) sidewalks and driveways and steps of hospitals; and

Class III (maximum): Toll plazas of highways and bridges, and aprons and loading areas of airports.

These classifications depend upon the allowable rate of snow melting. For example, a residential system does not have to melt snow as rapidly as a commercial system. In fact, a depth of snow of an inch for an hour or so during a heavy storm might not be objectionable with a residential system. On the other hand, a store manager would claim the system was inadequate if half an inch accumulated on the sidewalk in front of his store. The difference, then, between a Class I system and a Class II system is in the ability of each system to melt snow. The one feature that is common to all classes is that the systems must be adequate for some combination of weather factors. Or, the designer wants to be able to say that he will pay to melt snow whenever conditions are milder than some critical value but he is willing to have an inadequate system for a given fraction of the time. In other words, the designer will run a calculated risk providing he knows the odds of that risk. For a residential system, where initial cost must be at a minimum, the designer must accept more frequent snow accumulations.

Naturally, the owner is not concerned about an explanation of why there is an accumulation of snow on the sidewalk. It is immaterial whether the accumulation is due to excessive snowfall or whether it is due to

an extremely cold snowfall. In both cases, the ultimate reason is that an inadequate flow of heat is reaching the surface. The true analysis of heat output, then, depends on an analysis of the weather. This is true of all three system classes.

The total heat requirements of a snow melting system are determined, therefore, by (a) the total area of the snow melting slab, (b) the rate at which the snow is to be removed, and (c) the values and frequency distribution of each of the pertinent climatic variables (humidity, wind, temperature, and snowfall). Obviously (c) varies from city to city and, due to the complexity and number of calculations to obtain a frequency distribution of the four variables, the evaluation of (c) has been virtually impossible. However, by the use of punched cards and statistical tabulating machines, data have been derived so that the heat requirements for a given city can be simply presented.

The designer needs two types of information. First, the most severe combinations of variables on which to base his *design output*, and second, the heat required over the season so that *operating costs* can be determined. These data are given in Tables 1, 2, 3, and 4 which follow and which cover three cities in the Southwest region of the U. S.

Table 1

The first table gives some generalized information on snowfall and snow on the ground. The next to last item, "Greatest depth of snow on the ground" indicates the greatest depth to which snowfall has ever accumulated. Other items are self-explanatory.

Table 2

Table 2 contains the operating information of a snow melting system. For freezing temperatures (32 deg and below) but no snowfall the system may be "idling." That is, the designer may want to supply some heat to the slab so that there will be immediate melting when snow starts to fall. The column on mean temperature gives the average temperature during *freezing* temperatures. This temperature is used in calculating the "idling" load. The other term needed to calculate idling load is the wind velocity during the period of freezing temperatures.

TABLE 1—GENERAL INFORMATION ON SNOWFALL, SOUTHWEST REGION

Item	Albuquerque, N. M.	Amarillo, Tex.	Oklahoma City, Okla.
Approximate mean number of days with an inch or more of snow on the ground	20	15	20
Average number of inches of snowfal' per year	8.6	19.2	8.0
Greatest snowfall in 24 hours, inches	6.8	20.6	11.3
Greatest depth of snow on the ground, inches	6.8	13.5	10.5
Mean number of days per year with snowfall of 1 inch or more	4 (23 with trace or more)	6 (13 with trace or more)	3

The column "Hours of Snowfall" indicates the number of hours that snow is falling at rates equal to or greater than 0.01 inch of water equivalent per hour. Roughly speaking there are snowfalls of "trace" quantities about twice as often as there are for measurable quantities of 0.01 inch or more. It is assumed that these light falls can be handled by the idling load.

The remaining columns of Table 2 represent the frequency distribution of required heat output. This distribution is based on the solution to the basic equation for two values of the free area ratio A_r. This distribution represents the heart of the analysis and is also the basis for Tables 3 and 4.

Table 3

Table 3 contains the *design* heat requirement—as explained in the footnotes to Table 3. These design rates may be altered by the designer if he feels that a particular job should have a different design criterion from those given in the footnote. Any change in design selection should be based on the frequency distribution given in Table 2.

Table 4

Table 4 contains the data required to estimate the operating cost of a snow melting system. The footnotes to Table 4 explain the various items.

Use of the Tables

Example. Select the design heat output for a snow melting system at the Oklahoma City airport. This system is not to be used in the runways, but rather around the terminal building.

First, of course, it can be seen that a maximum of 394 Btu per (hour) (sq. ft.) has occurred and both rules 1 and 4 for Table 3 (see footnote) could establish a Class III design rate of 350 Btu per (hour) (sq. ft.). In addition, it is likely that once every year an output of 300 Btu would be required. On the other hand, the high winds and the pattern for $A_r = 0$ as shown in Table 2 indicate that it is the evaporation and heat transfer that is causing the higher loads. This is illustrated also by the fact that a Class II design rate is only 81 Btu per (hour) (sq. ft.).

If, then, the evaporation and heat transfer losses could be reduced, a considerable amount of energy probably could be saved. Refer again to Table 2, $A_r = 0$. The maximum is 81 Btu per (hour) (sq. ft.). The $A_r = 0.5$ maximum would be $\frac{1}{2}$ (394 + 81) = 238, and that only if the two maxima occurred simultaneously, which is unlikely. Therefore, either rule 1 or rule 4 must have determined the Class III design rate. Since this system is not to be used on the runways and the frequency of snowfall is low, it would seem justifiable to let $A_r = 0.5$ be the criterion for design. Then the design rate might be taken as $q_d = \frac{1}{2}$ (350 + 100) = 225.

As a precaution against inadequate warm-up capacity it might be advisable to idle the system at subfreezing temperatures at the idling rate of 56.2 Btu per (hour) (sq. ft.) as given in Table 4. This would require 40,400 Btu per (year) (sq. ft.) and at $0.75 per million Btu, a 10,000 square foot system would have an operating cost of just $300. This would not be unreasonable and would provide ice-free paths from the loading gates to the airplanes.

TABLE 2—DATA FOR DETERMINING OPERATING CHARACTERISTICS OF SNOW MELTING SYSTEMS IN THE SOUTHWEST REGION[1]

Period of No Snowfall

City	Air Temperature, Deg. F[2]		Mean Temperature During Freezing Period[6]	Wind Velocity, Freezing Period,[6] mph
	Over 32	Below or Equal to 32		
	Per-cent of Winter Hours with No Snow at Above Temperatures			
Albuquerque, N. M.	74.7	24.7	26.2	8.5
Amarillo, Tex.	73.1	26.0	24.6	13.3
Oklahoma City, Okla.	79.0	19.8	24.6	15.8

Period of Snowfall[3]

City	Hours of Snowfall[5]		Free Area Ratio, A_r	Required Output, Btu per Sq. Ft. per Hr.[4]									Maximum Output, Btu per Sq. Ft. per Hr.
	Per-cent	Hr. per Year		0–49	50–99	100–149	150–199	200–249	250–299	300–349	350–399	400–up	
				Frequency Distribution of Snowfall Hours at Above Outputs, Per-cent[5]									
Albuquerque, N. M.	0.6	22	1	62.0	25.4	7.6	4.2	0.0	0.8	—	—	—	259
			0	94.1	5.9	—	—	—	—	—	—	—	82
Amarillo, Tex.	0.9	33	1	33.7	35.4	15.4	10.7	3.0	1.8	—	—	—	260
			0	88.1	10.1	1.8	—	—	—	—	—	—	143
Oklahoma City, Okla.	1.2	44	1	27.8	18.7	17.0	12.6	14.3	5.9	2.7	1.0	—	394
			0	95.7	4.3	—	—	—	—	—	—	—	81

[1] The period covered by this table is from Nov. 1 to March 31, incl., with February taken as a 28¼ day month. Total hours in period = 3630.
[2] The percentage in Columns 2 and 3 plus the percent under operating time total 100%. Note that "Hours of Snowfall" does not include idling time, and is not actual operating time. See text.
[3] Snowfalls of trace amounts are not included; hence, "Hours of Snowfall" includes only those hours of 0.01 inches water equivalent per hour snowfall.
[4] Output does not include allowance for back or edge losses since these depend on slab construction.
[5] Percentages total 100% of the number of hours per year of snowfall.
[6] "Freezing Period" is that during No Snowfall when the air temperature is 32 deg or below.

One other precaution should be taken. Since the snows are generally accompanied by high winds, drifting might be a problem. The precaution then would be to keep the snow melting panels in lanes where drifts would not accumulate quickly or could be removed easily. For example, where walks run along the windward side of a building, the lanes should be wide so that traffic could move along the edge away from the building. In addition, hedges might be planted along both edges of the walks leading to the gates from the administration building. The hedges could act as "snow fences." Judicious planning of the layout could help reduce the load so that the design rate could be kept to an economical figure.

Southwest Region

Normally one does not think of the Southwest as snow country. In one sense it is not; the frequency of snow fall is not great. In another sense, however, and that is the one that the heating engineer should consider, snow is a problem. A snow melting system in the Southwest Region would need a design output comparable in size to one in Columbus, Ohio, for example.

The Southwest is defined here as a long narrow belt bounded on the north by the 37th parallel—the northern boundaries of Arizona, New Mexico, and Oklahoma. The southern boundary runs along the Red River into the Texas Panhandle, then diagonally down to the Gila River in New Mexico and west to Phoenix and the Colorado River. The Oklahoma-Arkansas line forms the eastern edge, and the Colorado River the western edge.

This definition of the Southwest includes all of Oklahoma, the Texas Panhandle from Lubbock north, about 75% of New Mexico, and the northern half of Arizona. These sections of New Mexico and Arizona represent the southeastern corner of the Rocky Mountains.

The Rockies have a tremendous effect on the weather of this region, even as far east as Oklahoma City. Albuquerque is representative of the climate in this corner of the Rockies. The winters are quite dry, with less than two inches of moisture. The greatest portion of the winter precipitation is in the form of snow—almost nine inches

TABLE 3—DESIGN DATA FOR SNOW MELTING SYSTEMS, SOUTHWEST REGION

City	Design Output, Btu per (Hour) (Sq Ft)		
	Class I System[1]	Class II System[2]	Class III System[3]
Albuquerque, N. M.	71	82	167
Amarillo, Tex.	98	143	241
Oklahoma City, Okla.	66	81	350

[1] For Class I (residential) Systems, the design output is set at that required heat output (see Table 2) when $A_r = 0$ at the 98th percentile of the frequency distribution; that is, where 98% of the hours have this output or less.
[2] For Class II (commercial) Systems, the design output is the maximum output when $A_r = 0$ in Table 2 (last column).
[3] For Class III (industrial) Systems, the design output is determined by the following four requirements: (1) Output is never exceeded for two consecutive hours; (2) Output for $A_r = 1$; Table 2, is at least 1 Btu per hour per sq ft greater than maximum output for $A_r = 0$; (3) A_r is greater than or equal to 0.5 the maximum requirement shown in Table 2 for $A_r = 1$. That is, $q_4 = q_s + q_m + 0.5\ (q_s + q_h)$ for the conditions where $q_t = q_s + q_m + q_h + q_e$ are a maximum; (4) The free area ratio A_r is unity for at least 98% of the hours listed in Table 2.

TABLE 4—YEARLY OPERATING DATA, SOUTHWEST REGION

City	Idling			Melting		
	Time,[1] Hr. per Year	Rate,[2] Btu per (Hour) (Sq. Ft.)	Output,[3] Btu per (Year) (Sq. Ft.)	Time,[4] Hr. per Year	Class[5]	Output[6] Btu per (Year) (Sq. Ft.)
Albuquerque, N. M.	897	32.5	29,100	22	I	908
					II	969
					III	1150
Amarillo, Tex.	944	51.1	48,200	33	I	2150
					II	2520
					III	2770
Oklahoma City, Okla.	719	56.2	40,400	44	I	2380
					II	2800
					III	5400

[1] From Table 2, Column 3 × 3630 (hr per year).
[2] Rate when idling, Btu per (Hr) (Sq Ft) = (0.27V + 3.3) (32 — t), where V = wind velocity from Column 5, Table 2, and t = air temperature from Column 4, Table 2.
[3] Product of the two preceding columns.
[4] Hours of Snowfall, from Column 7, Table 2.
[5] See footnote for Table 3.
[6] Based on the condition that surface temperature is maintained at 33 deg until required output exceeds design output, at which time design output is used regardless of required output. Distribution of required output based on Table 2.

per year. Snow does not remain on the ground very long in the city itself, but about 25 miles from the city there is excellent skiing. Of the three cities representing the Southwest, Albuquerque is the most arid, and has less frequent snow falls. Even though Albuquerque is quite high (5300 feet), the winter temperature is very mild. About once a year the temperature drops to zero and about three days a year have a maximum temperature below freezing. For that reason, snow rarely remains on the ground more than 24 hours, although about 20 days per year have snow cover.

Amarillo is the coldest of the three cities in this region and probably has the most erratic climate of the three, especially in the winter. It is quite common for the temperature to drop 50 or 60 degrees within 12 hours. This is due to southerly pressure gradients and resultant strong northerly winds. About two days a year are below zero, but 13 have maximum temperatures below freezing, and 92 days have minimum temperatures below 32.

Even though Amarillo has more than twice the snowfall that Oklahoma City and Albuquerque have, it has the least number of days (15) of snow cover. This might be because a greater portion of the snowfall is with heavier snowfalls. This seems to be indicated by the data in Table 1. Albuquerque has snow cover 20 days per year with 8.6 inches of snow per year. Amarillo has snow cover just 15 days per year with 19.2 inches of snow per year. On the other hand, Albuquerque records show snowfalls 23 days per year and Amarillo only 13. In Table 2 it is shown that the 23 days in Albuquerque take about 22 hours or the snowfalls average about one hour each. Amarillo's average is nearly 3 hours each.

The absence of any natural protection around Amarillo, plus the fact that it is in the path of high and low pressure areas, accounts for the many days of extremely high winds and dust storms. Every month of the year has a record high wind in excess of 55 mph. The prevailing direction is south, however, and this keeps the temperature above freezing. With all this high wind, with an average velocity of 12.5 mph during the five winter months, Oklahoma City has the highest average wind during freezing weather (see Table 2). When it gets cold in Oklahoma City it is generally windy. In Amarillo, it is colder and windier, but when the temperature drops below freezing, Oklahoma City has the higher wind velocity, 15.8 mph as compared to 13.3 in Amarillo. The average winter temperatures are 43.5 and 42.5 deg. for Oklahoma City and Amarillo, respectively. From Table 2 note that the average subfreezing temperature during no snowfall is the same for both cities, namely 24.6 deg. F. Amarillo, however, has a subfreezing temperature 26.9% of the time (counting snowfall), however, and Oklahoma City only 21%.

Oklahoma City is much like Amarillo in that it lies in an exposed, plateau area except that it is at a lower elevation, 1300 feet as compared to 3600 feet. Some influence is exerted by the warm, moist air from the Gulf of Mexico, but generally the weather is characteristic of the Great Plains. This means that there are pronounced daily temperature changes. Winters are mild and short. The temperature drops to zero about once a year, generally in January. About 70 days per year have minimum temperatures below freezing, but only 12 have maximums below freezing. The normal frost-free season is 224 days. If it were not for the winds that accompany the snow, Oklahoma City would not have a severe snow melting problem. As it is, however, the maximum requirement is extremely heavy.

As shown in Table 2, a maximum output of 394 Btu per (hour) (sq. ft.) has been recorded and outputs in excess of 300 can be expected at least once per year. In fact, only three other cities in this study have maxi- All of which are in the plateau area just east of the mums as high: Cheyenne, Great Falls, and Rapid City. Rocky Mountains.

The economic problem of snow melting in Oklahoma City is considerable. The operating time during actual snowfall is only 44 hours per year and only 763 hours per yr counting *all* subfreezing temperature. For that short period a plant would have to have a capacity of 350 Btu per (hour) (sq. ft.) (see Class III system, Table 3).

Consulting Engineer's Value Rising on Construction Team

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The growing complexity of building design and a greater demand for flexible air conditioning result in a more vital role for the consulting engineer in building construction.

THE responsibilities of the mechanical engineer in the design and equipment of modern buildings have increased spectacularly in the past decade. Where once mechanical costs in a new structure were as little as 10 percent of the total, today it is not uncommon to allocate as much as 45 percent to this category.

The architect continues to exercise the major function in planning and design but more and more is called on to coordinate the contributions of other specialists and consultants. With the growing investment in heating, ventilating, air conditioning, plumbing and other mechanical equipment, he must place increasing reliance on engineering associates.

Just as it is imperative to retain a competent architect to plan a building, clearly it is now essential to provide a qualified engineer to assist the architect from the outset.

It is not just the increased volume of mechanical services that expands the role of the engineer but the consumer's more exacting demands and the growing complexity of modern equipment to meet those demands. Concomitant with the post-war boom in construction volume has come a virtual revolution in building materials, methods and equipment. Current performance standards are such that the air conditioning system installed 10 years ago probably is considered obsolete and would not be tolerated in a new building today.

Faced with new materials and standards in air conditioning, plumbing, lighting, acoustics, fenestration, vertical transportation, the architect needs a team to help him and the engineer plays an increasingly important part. In the following discussion, we concentrate on air conditioning, but obviously the same considerations apply to the other mechanical services.

Why An Engineer?

The owner who wishes to construct a new building or improve old space usually has only a vague notion of what he wants in air conditioning. He knows why he is building the structure and how he proposes to use the space. If he has had any experience with modern buildings, he knows the standards of comfort he wants to achieve—probably individual control of temperature in adjoining areas to meet varying conditions and different individual preferences.

Obviously, he wants to spend no more than necessary on equipment and hopes to keep operation and maintenance to a minimum. But he knows little or nothing of the air conditioning equipment he requires to meet the

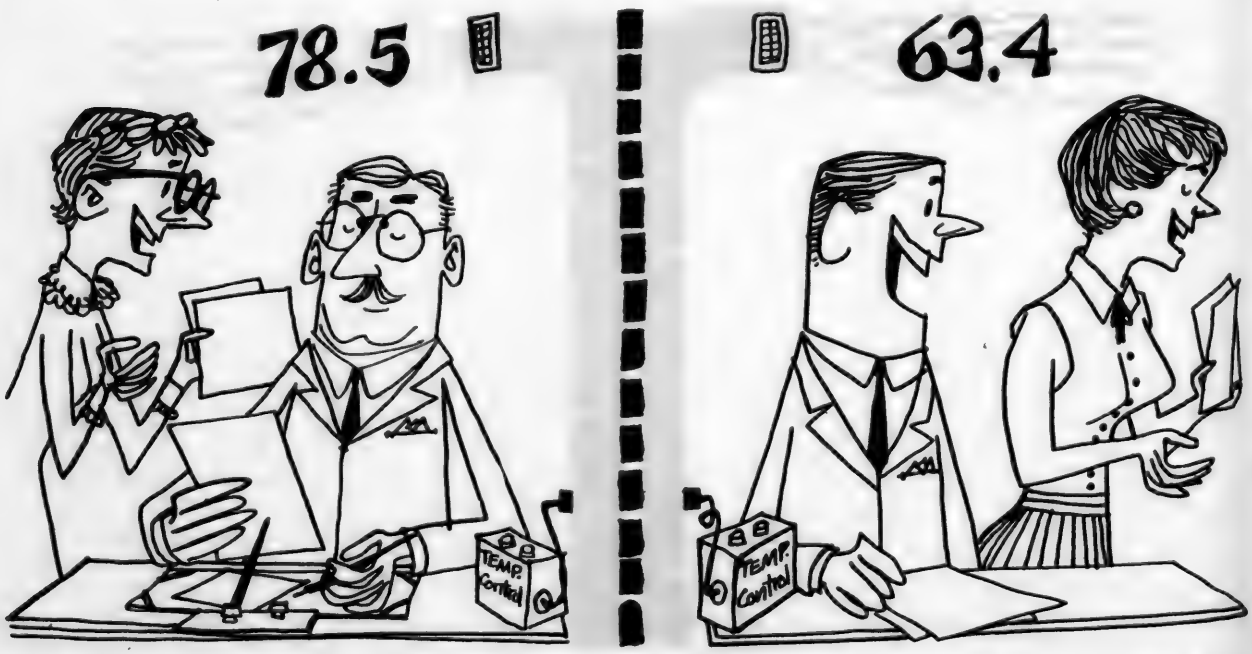

Fig. 1. Modern standards of air conditioned comfort often demand individual control of temperature in adjacent areas. Only a qualified engineer can determine how this can best be achieved.

complex standards of performance.

Perhaps his particular needs can best be met with a dual-duct system with cold air in one duct and warm air in the other, blended in varying proportion to meet the needs of each office or area.

Perhaps the problem would best be solved by cooling air to the lowest temperature required and providing individual reheating coils to meet needs of areas that require warmer air.

The building in question may demand an induction unit system with individual units in each space receiving cooled, dehumidified air under pressure and also a supply of chilled water from a central source. Air is ejected from each unit through jets, inducing a flow of warm air from the building space through the conditioning unit where it is cooled by the chilled water. This system provides the desired flexibility while saving space by substitution of compressed air and water pipes for the customary large air ducts.

These are only a few of the many techniques available. One nationally prominent engineer tells us that there are a half dozen reasonably good solutions to the problem presented by each building and that the best engineers study all of them in order to determine which is best. Obviously, only a qualified engineer can appraise the problem and determine the one or combination of systems best suited to the problem assigned.

What Jobs Require An Engineer?

We asked some of the nation's most prominent engineers to tell us what kind or size of job required an engineer's counsel. One replied that it is the nature of the problem rather than the size of the job that determines the need for engineering services. Thus, a small restaurant or shop or residence might profit to an important degree from engineering counsel in selection and arrangement of air conditioning equipment.

Another noted engineer replied that professional services are required in any situation where procedure has not been standardized. He added that in all the years of his experience he had never had two identical jobs.

The conclusion must be that any air conditioning job can profit from engineering advice and that certainly every project involving major expenditures cannot risk proceeding without professional counsel.

Why A Consulting Engineer?

In most cases, it is the consulting engineer who can best advise on air conditioning systems. The air conditioning dealer and the equipment manufacturer may well have highly qualified engineers on their staffs, but necessarily they plan in terms of their own company's equipment. In some cases this can prove a limiting factor.

The consulting engineer, whether an independent firm or a member of a firm of architects and engineers, is best qualified and in the best position to advise the owner on his air conditioning problems. Presumably he has free choice of all applicable equipment and methods. He is the owner's consultant and has no other concerns or interests. As such, he first determines the owner's objectives. In every case he must weigh considerations of initial cost of equipment, space requirements, costs of operation and maintenance, quality of performance and dependability. Thus, if the owner is putting up a building to rent space at a profit, the engineer will give close

Fig. 2. In the design of an air conditioning system, the consulting engineer must consider not only physical factors but the owner's economic objectives.

attention to operating costs. If the building is to be built for sale at a profit, primary attention will go to initial costs. If the owner is a company seeking to provide comfortable and efficient quarters for its own use, the engineer will give first thought to quality and dependability of performance.

As the owner's consultant, the engineer learns all he can of the current situation and future plans that might influence his design and specifications. The engineer does not operate in a vacuum or an ivory tower but seeks to provide the system that will best serve the interests of his client. For example, in air conditioning a bank building, the fact that a manufacturer of refrigeration compressors is the bank's largest depositor certainly would influence the choice of equipment.

The use pattern for the building, not just this year but 20 or 30 years from now, is an important design consideration. Is a large open floor likely to be cut up by partitions the year after next? If so, the conditioning plan must be sufficiently flexible to allow for the change. The company headquarters building may have an initial population of 1,500 people, but is it reasonable to expect an increase of 700 in the next 10 years? If so, it may be

desirable to install an original air conditioning system adequate to the anticipated larger load or at least to make provision for economical expansion.

The owner probably does not realize the speed of changing standards but the engineer knows that he must evaluate the trends and provide years-ahead design if his air-conditioning system is to be deemed satisfactory in 10 years let alone during the economic life of the building. He must deal not only with anticipated standards in air conditioning but also provide for the heat load of increased lighting levels.

Sometimes a large company builds so many structures that it becomes feasible to have its own design department with highly qualified architects and engineers. Even these firms find it profitable occasionally to call in a consultant, not because they are not capable of solving their own problems but solely to introduce new ideas. The consultant deals with a wider variety of situations and actually learns much from his clients and other members of the construction planning team. In this way the consultant has opportunity to become familiar with new equipment, designs and ideas. It is on this broad and varied base of experience that he builds solutions for his clients' problems.

How To Hire An Engineer

There are many sound ways for an owner to build the planning team for a project. He may retain a good firm of architects and engineers with well qualified men in both departments. All that we have said of consulting engineers applies not only to separate engineering firms but equally to those architectural firms which include on their staffs consulting engineers of high ability and stature. A survey conducted a few years ago by the American Institute of Architects showed that 24 percent of the architectural firms responding had their own engineering staffs and 76 percent used the services of consulting engineers. The owner may call on one or more architects for specialized knowledge and skills and hire a separate engineering consultant. He may retain an architect and authorize him to call in a consulting engineer. This last method is preferred by many engineers because they must work closely with the architect.

Whatever the method of constructing the team, two things are essential. First, the client must make adequate provision for the engineer's fee and not expect him to be paid out of the architect's fee. Only in this way can the owner expect to get good engineering counsel and the professional attention his project requires. Second, the engineer should be retained at the outset of the project. Not only does the engineer need to evolve his design during the initial planning phase, but also the engineer can offer important counsel to the architect to provide a sound basis for efficient mechanical services. For example, the air conditioning system is influenced by wall construction, insulation, size and kind of windows, story height, column spacing, and other factors. The best solutions can be reached if these professionals work together from the start.

Just as it is desirable to call in the engineer at the beginning of a project, it is profitable to utilize his services through to the conclusion. The engineer should have close supervision of construction and of final test and adjustment. This is standard practice with some good firms but is by no means universal. There are evident advantages, though, in having the engineer on hand to insure that his plans are properly carried out and that the final system performs according to specification.

What Do Engineering Services Cost?

Methods of establishing a fee for a consulting engineer vary widely. Some firms prefer to work on a percentage basis, with fees ranging from 2 to 15 percent of project costs. Some appraise the job and set a flat fee. Others set a modest retainer and charge two or three times the actual salaries of the men who work on the project for the actual time they spend. The means of reaching a figure is relatively unimportant since, in the final analysis, the good engineer will devote as much time to the project as it requires unless restricted by an inadequate fee.

Architects, engineers, builders and knowledgeable clients all agreed that the consultant's fee is the worst place to economize. With construction costs high and buildings increasingly complex, it is more important than ever today to plan carefully and wisely. A dollar spent on planning may well save 10 dollars in actual construction. Skilled, informed, imaginative architects and engineers must be employed to help the owner attain his objectives. In the long run, planning doesn't cost a dime. It is a means of obtaining full value for the major expenditure on a building or an air conditioning system.

SATURATION PROPERTIES OF FREON-22

Temperature, Deg. F.	Pressure, Lb. per Sq. In.		Volume, Cu. Ft. per Lb.		Density, Lb. per Cu. Ft.		Enthalpy, Btu per Lb.			Entropy, Btu per Lb. per Deg. Abs.	
	Abs.	Gage	Liq.	Vapor	Liq.	Vapor	Liq.	Latent	Vapor	Liq.	Vapor
0	38.79	24.09	0.01192	1.373	83.90	0.7282	10.63	94.39	105.02	0.0240	0.2293
2	40.43	25.73	0.01195	1.320	83.68	0.7574	11.17	94.07	105.24	0.0251	0.2289
4	42.14	27.44	0.01198	1.270	83.45	0.7877	11.70	93.75	105.45	0.0262	0.2285
5	43.02	28.33	0.01200	1.246	83.34	0.8034	11.97	93.59	105.56	0.0268	0.2283
6	43.91	29.21	0.01201	1.221	83.23	0.8191	12.23	93.43	105.66	0.0274	0.2280
8	45.74	31.04	0.01205	1.175	83.01	0.8514	12.76	93.11	105.87	0.0285	0.2276
10	47.63	32.93	0.01208	1.130	82.78	0.8847	13.29	92.79	106.08	0.0296	0.2272
12	49.58	34.88	0.01211	1.088	82.55	0.9191	13.82	92.47	106.29	0.0307	0.2268
14	51.59	36.89	0.01215	1.048	82.32	0.9545	14.36	92.14	106.50	0.0319	0.2264
16	53.66	38.96	0.01218	1.009	82.09	0.9911	14.90	91.81	106.71	0.0330	0.2260
18	55.79	41.09	0.01222	0.9721	81.86	1.029	15.44	91.48	106.92	0.0341	0.2257
20	57.98	43.28	0.01225	0.9369	81.63	1.067	15.98	91.15	107.13	0.0352	0.2253
22	60.23	45.53	0.01229	0.9032	81.39	1.107	16.52	90.81	107.33	0.0364	0.2249
24	62.55	47.85	0.01232	0.8707	81.16	1.149	17.06	90.47	107.53	0.0375	0.2246
26	64.94	50.24	0.01236	0.8398	80.92	1.191	17.61	90.12	107.73	0.0379	0.2242
28	67.40	52.70	0.01239	0.8100	80.69	1.235	18.17	89.76	107.93	0.0398	0.2239
30	69.93	55.23	0.01243	0.7816	80.45	1.280	18.74	89.39	108.13	0.0409	0.2235
32	72.53	57.83	0.01247	0.7543	80.21	1.326	19.32	89.01	108.33	0.0421	0.2232
34	75.21	60.51	0.01250	0.7283	79.97	1.373	19.90	88.62	108.52	0.0433	0.2228
36	77.97	63.27	0.01254	0.7032	79.73	1.422	20.49	88.22	108.71	0.0445	0.2225
38	80.81	66.11	0.01258	0.6791	79.49	1.473	21.09	87.81	108.90	0.0457	0.2222
40	83.72	69.02	0.01262	0.6559	79.25	1.525	21.70	87.39	109.09	0.0469	0.2218
42	86.69	71.99	0.01266	0.6339	79.00	1.578	22.29	86.98	109.27	0.0481	0.2215
44	89.74	75.04	0.01270	0.6126	78.76	1.632	22.90	86.55	109.45	0.0493	0.2211
46	92.88	78.18	0.01274	0.5922	78.51	1.689	23.50	86.13	109.63	0.0505	0.2208
48	96.10	81.40	0.01278	0.5726	78.26	1.747	24.11	85.69	109.80	0.0516	0.2205
50	99.40	84.70	0.01282	0.5537	78.02	1.806	24.73	85.25	109.98	0.0528	0.2201
52	102.8	88.10	0.01286	0.5355	77.77	1.868	25.34	84.80	110.14	0.0540	0.2198
54	106.2	91.5	0.01290	0.5184	77.51	1.929	25.95	84.35	110.30	0.0552	0.2194
56	109.8	95.1	0.01294	0.5014	77.26	1.995	26.58	83.89	110.47	0.0564	0.2191
58	113.5	98.8	0.01299	0.4849	77.01	2.062	27.22	83.41	110.63	0.0576	0.2188
60	117.2	102.5	0.01303	0.4695	76.75	2.130	27.83	82.95	110.78	0.0588	0.2185
62	121.0	106.3	0.01307	0.4546	76.50	2.200	28.46	82.47	110.93	0.0600	0.2181
64	124.9	110.2	0.01312	0.4403	76.24	2.271	29.09	81.99	111.08	0.0612	0.2178
66	128.9	114.2	0.01316	0.4264	75.98	2.346	29.72	81.50	111.22	0.0624	0.2175
68	133.0	118.3	0.01320	0.4129	75.72	2.422	30.35	81.00	111.35	0.0636	0.2172
70	137.2	122.5	0.01325	0.4000	75.46	2.500	30.99	80.50	111.49	0.0648	0.2168
72	141.5	126.8	0.01330	0.3875	75.20	2.581	31.65	79.98	111.63	0.0661	0.2165
74	145.9	131.2	0.01334	0.3754	74.94	2.664	32.29	79.46	111.75	0.0673	0.2162
76	150.4	135.7	0.01339	0.3638	74.68	2.749	32.94	78.94	111.88	0.0684	0.2158
78	155.0	140.3	0.01344	0.3526	74.41	2.836	33.61	78.40	112.01	0.0696	0.2155
80	159.7	145.0	0.01349	0.3417	74.15	2.926	34.27	77.86	112.13	0.0708	0.2151
82	164.5	149.8	0.01353	0.3313	73.89	3.019	34.92	77.32	112.24	0.0720	0.2148
84	169.4	154.7	0.01358	0.3212	73.63	3.113	35.60	76.76	112.36	0.0732	0.2144
86	174.5	159.8	0.01363	0.3113	73.36	3.213	36.28	76.19	112.47	0.0744	0.2140
88	179.6	164.9	0.01368	0.3019	73.09	3.313	36.94	75.63	112.57	0.0756	0.2137
90	184.8	170.1	0.01374	0.2928	72.81	3.415	37.61	75.06	112.67	0.0768	0.2133
92	190.1	175.4	0.01379	0.2841	72.53	3.520	38.28	74.48	112.76	0.0780	0.2130
94	195.6	180.9	0.01384	0.2755	72.24	3.630	38.97	73.88	112.85	0.0792	0.2126
96	201.2	186.5	0.01390	0.2672	71.95	3.742	39.65	73.28	112.93	0.0803	0.2122
98	206.8	192.1	0.01396	0.2594	71.65	3.855	40.32	72.69	113.00	0.0815	0.2119
100	212.6	197.9	0.01402	0.2517	71.35	3.973	40.98	72.08	113.06	0.0827	0.2115
102	218.5	203.8	0.01408	0.2443	71.05	4.094	41.65	71.47	113.12	0.0839	0.2111
104	224.6	209.9	0.01414	0.2370	70.74	4.220	42.32	70.84	113.16	0.0851	0.2107
106	230.7	216.0	0.01420	0.2301	70.42	4.347	42.98	70.22	113.20	0.0862	0.2104
108	237.0	222.3	0.01426	0.2233	70.11	4.479	43.66	69.58	113.24	0.0874	0.2100
110	243.4	228.7	0.01433	0.2167	69.78	4.614	44.35	68.94	113.29	0.0886	0.2096
112	249.9	235.2	0.01440	0.2104	69.45	4.752	45.04	68.30	113.34	0.0898	0.2093
114	256.6	241.9	0.01447	0.2043	69.12	4.896	45.74	67.64	113.38	0.0909	0.2089
116	263.4	248.7	0.01454	0.1983	68.78	5.043	46.44	66.98	113.42	0.0921	0.2085
118	270.3	255.6	0.01461	0.1926	68.44	5.192	47.14	66.32	113.46	0.0933	0.2081
120	277.3	262.6	0.01469	0.1871	68.10	5.345	47.85	65.67	113.52	0.0945	0.2078

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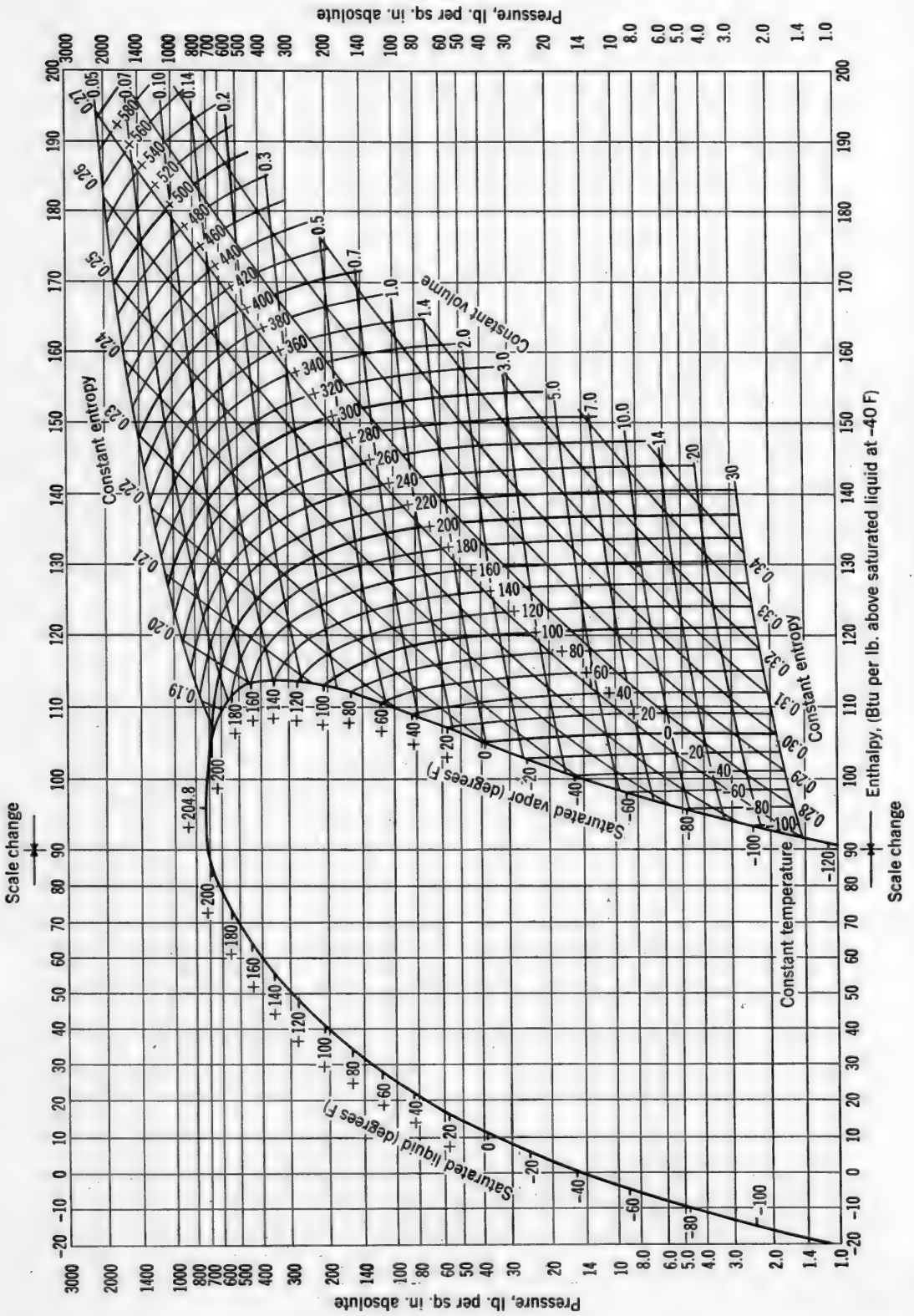
PRESSURE–ENTHALPY CHART—FREON–22



Characteristics and Uses of

Turbine Type Pump Features

in Air Conditioning and Heating

E. L. ABRAMSON
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A discussion of basic engineering fundamentals of the turbine type pump and the use of this pump in air conditioning and heating applications. Operation is described.

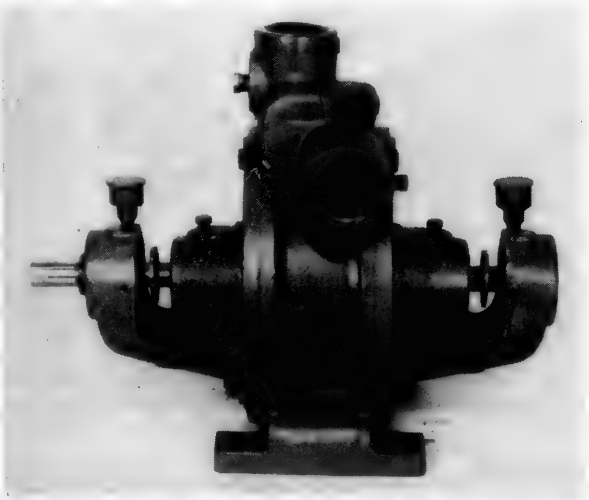


Fig. 1. Modern, two-stage turbine-type pump with single inside mechanical seals, for handling hot condensate against pressure differentials of 125 to 150 psi.

ONE of the most economical pumping units available to refrigeration, air conditioning and heating system designers and contractors is the turbine pump, so named because its impeller resembles that of a steam turbine. Compact in design, the turbine-type pump, Fig. 1, develops several times the pressure produced by a centrifugal pump having an impeller of equal diameter and operating at the same speed.

This type unit has a single moving part that has free running clearance, resulting in relative freedom from maintenance.

Both the turbine type and the centrifugal pump make use of centrifugal force. Both, unlike positive displacement pumps, develop definite maximum pressures.

Maximum pressure in a centrifugal pump is a function of impeller diameter and speed, but in a turbine type pump operating at equal speed, no such fixed relationship exists between its maximum pressure and the impeller diameter. Instead, the high pressure that characterizes the turbine type pump is determined by the dimensions of its impeller and channel.

Small Units Develop High Pressure

How the turbine type pump develops more pressure than the centrifugal, can be seen by examining the sectional views of Figs. 2 (centrifugal pump) and 3 (turbine type pump). These show not only differences in the structural details of each type, but also differences in flow patterns and in the forces that act on the liquid in developing pressure energy.

In a centrifugal pump, Fig. 2, liquid enters the impeller at its center and is centrifugally thrown outward into the channel. From there it discharges through the outlet nozzle. Thus, in pumps of this type, the liquid can pass between the impeller vanes only once. As a result, the centrifugal force, convertible into pressure, depends entirely upon the impeller diameter, and its speed of rotation.

Turbine type pumps have a different flow pattern and develop their energy in a different manner. Actually, turbine type pumps are of two general types. One has impellers of inclined-vane design, with vanes on only one side of the impeller. The other type is more widely used, costs less to build, yet is comparable in efficiency under like operating conditions. It has radial-vane impellers. This type which is considered in this article, is usually designed with both inlet and outlet connections in the shell, thereby making it unnecessary to disturb piping connections to open the pump for examination or repair. The inclined vane type, with vanes on only one side of the impeller, usually incorporates the inlet nozzle as part of the cover, and one or both of the piping connections must be broken in order to open the pump.

Liquid enters the channel of the radial-vane turbine

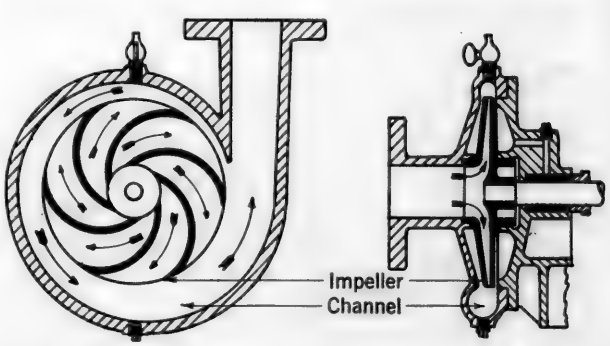


Fig. 2. Sectional view of centrifugal pump, with arrows showing pattern of liquid flow.

type pump, on both sides of the impeller, Fig. 3, at a point adjacent to the discharge. The vanes carry the liquid peripherally for almost a complete revolution before the block diverts it to the discharge opening. At the same time, radial flow through the impeller vanes, combined with the peripheral flow, forms the pattern shown.

The liquid, recirculated between the vanes, travels a long distance from inlet to outlet, and while it travels this distance, impeller vanes give it repeated impacts or impulses that develop pressure energy in the liquid.

Development of Pressure Energy

This series of impulses is comparable to the multi-staging of centrifugal impellers. Total developed energy in a multistage centrifugal pump is a summation of the energy developed by the impellers in each stage. In a turbine type pump, total developed energy is the summation of the energy imparted by its numerous impeller vanes. Figure 3 indicates how pressure developed in the four sectors of a single-stage turbine type pump may be compared to that in a four-stage centrifugal operating at the same speed and having impellers of like diameter.

Pressure developed in the channel of a turbine type pump is minimum at the inlet port and gradually increases to maximum at the discharge port. Exact divisions of pressure are shown in the drawing, but actually, slight deviations are probable.

Most turbine type pumps are of single or two-stage design, although units up to five stages, horizontal as well as deep well types, have been manufactured.

Operating Characteristics

The turbine type pump has wide operating range, and an ability to develop high pressures with a small diameter impeller.

Steep Head Capacity Characteristic. Figure 4 shows performance curves for a turbine type pump and those for a centrifugal pump of the same capacity range, both pumps turning at 1750 rpm. Differences in dimensions are considerable. Diameter of the turbine type pump impeller is 4.5 inches against 7.0 inches for the centrifugal pump impeller. Note the steep head-capacity curve of the turbine type pump, and that slight variaitons in head conditions have little effect on capacity. This characteristic makes a turbine type pump well suited for

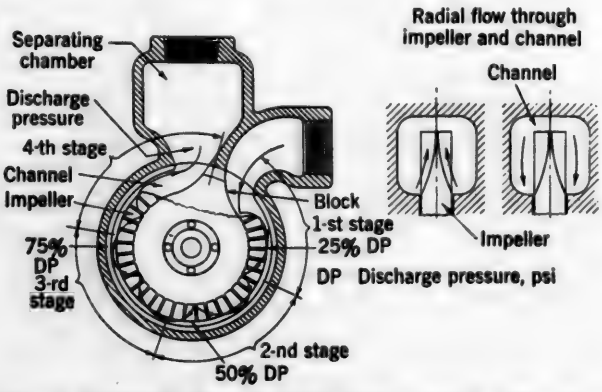


Fig. 3. Sectional view of turbine-type pump, with arcs equivalent to centrifugal stages.

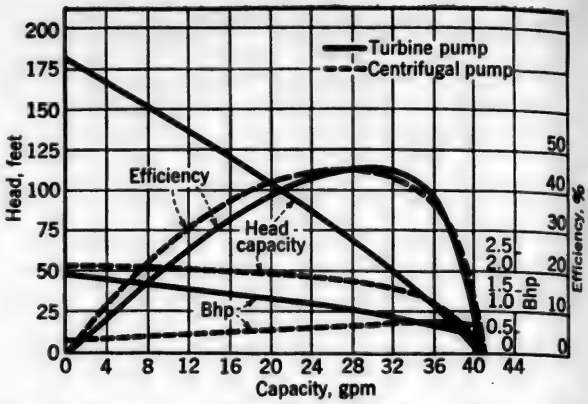


Fig. 4. Comparison of performance curves for a turbine pump of 4.5 in. dia and a centrifugal pump of 7 in. dia, both operating at 1750 rpm.

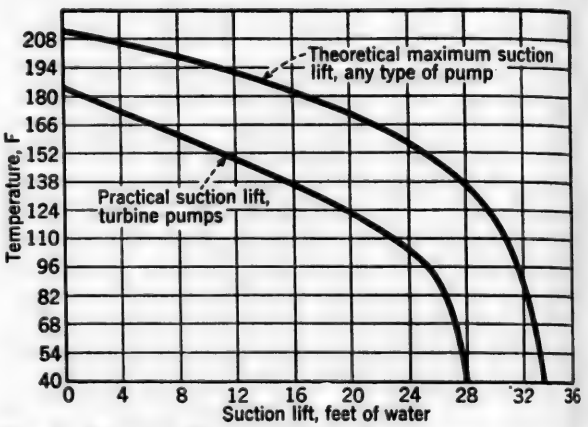

Theoretical maximum suction lift, any type of pump
Practical suction lift, turbine pumps
Temperature, F
Suction lift, feet of water

Fig. 5. Practical lift of a turbine type pump plotted for comparison with the maximum theoretical suction lift of any type of pump.

use where the exact head is difficult to determine, or where it varies due to changing conditions.

Superior Suction Lift. Of all classes of pumps, the turbine type offers exceedingly favorable lift characteristics. Based on cold water rating, curves plotted in Fig. 5 show that the maximum practical suction lift of the typical turbine type pump is within some 5.5 ft of the theoretical maximum for any type of pump. That is why turbine type pumps win preference for lifting liquids from lower levels, and especially for handling hot water and liquids that vaporize at normal temperatures.

Self-Priming Ability. Another important advantage of the turbine type pump is its self-priming ability. Modifications, such as a separating chamber or suction trap, further increase its air or vapor handling capacity. The basic principle employed, separation of air and vapor from a liquid by difference in weight, calls for recirculating a small amount of liquid in the channel. Such action alternately entrains air at the inlet and discharges it into the separating chamber.

Vapor Handling Feature. The ability to prime itself by removing air, assures peak performance in handling a liquid close to its vaporization point. Even though bubbles form in the suction nozzle, a turbine type pump will carry them along with the liquid discharging them in the same manner that it discharges air in self-priming. This feature makes turbine type pumps ideal not only

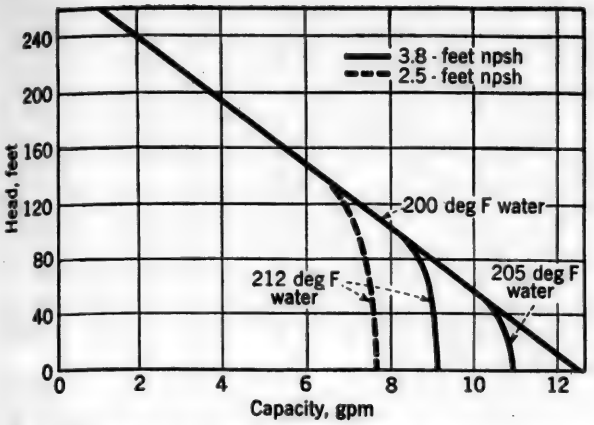


Fig. 6. Capacity of small pump decreases with temperature rise at low heads, but reaches full rating at high heads.

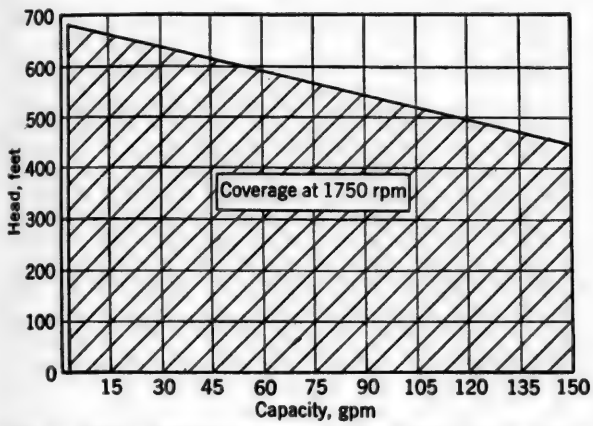


Fig. 7. Wide operating range of the turbine type pump.

for handling hot water, but also for pumping refrigerants and liquids that may vaporize at normal temperatures. Pumps of this type can handle steam and air along with hot water, remaining free from vapor bind or lock.

Low NPSH Needs. Capacity and inlet opening size determine the net positive suction head (NPSH) needed by a turbine type pump. A unit of conventional design, operating at recommended speed, requires a net positive suction head of 11 ft to pump its full cold water rating. Only tests can determine the exact NPSH needs of each pump size. Figure 6 shows the curve for a typical small capacity unit pumping hot water. Decreased delivery results at lower net positive suction heads. This chart, however, is not intended as a standard for all turbine type pumps.

Wide Operating Range. Turbine type pumps of modern design readily handle from 2 to 150 gpm at heads from 10 to 680 ft, as indicated in Fig. 7. Each size of turbine pump develops maximum efficiency at a specific capacity and head. But useful operating ranges are wider than such capacity ratings indicate. Efficiency will be lower, yet still within desirable limits. Manufacturers' selection tables are written with this in consideration because it reduces the number of pump sizes needed and results in obvious economies.

Efficient Performance. The average efficiency of turbine type pumps is between 30 and 50%. This is not high, when compared with that of positive displacement or centrifugal pumps. On the other hand, when compared on a basis of capacity versus head, turbine type pump efficiency is generally comparable for capacities up to 50 gpm at heads of 100 ft or more, and a little less for capacities from 50 to 100 gpm at the same head. Operating speeds of turbine type pumps range from 1,000 to 4,000 rpm. Impeller diameter and mechanical design dictate the limiting speed. Impellers that measure from 3 to 5 inches in diameter permit satisfactory operation at speeds up to 4,000 rpm, and those with diameters of from 6 to 7 inches show good efficiency at speeds up to 2,000 rpm. At higher speeds, efficiency drops off due to excessive slippage.

Turbine Type Pump Applications

Automatic Condensate Return Units. Factories, apartment houses, office buildings, greenhouses and the like use turbine type pumps to return hot condensate from heat transfer systems to the boiler.

Many turbine type pump manufacturers now produce package units consisting of tank, float switch, motor and turbine type pump. The switch starts the motor when tank water reaches a high level, and stops it when the tank is almost empty. Standby pumping units, frequently

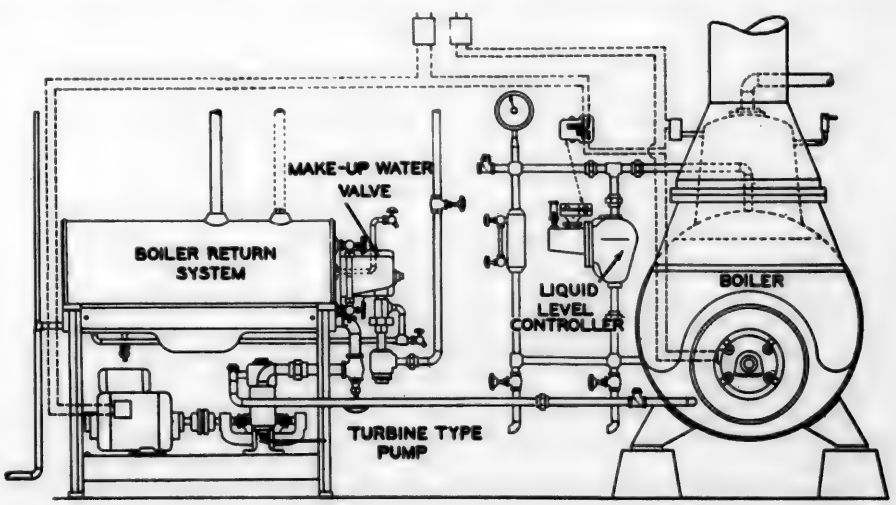


Fig. 8. Typical boiler return hook-up showing arrangement of turbine pump, make-up water valve and liquid level controller.

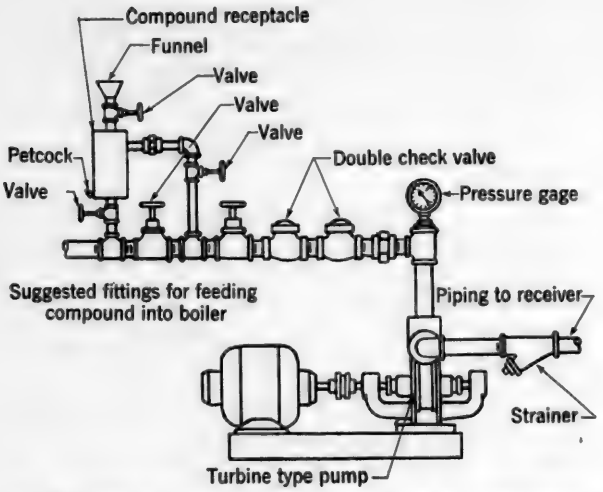


Fig. 9. Piping hook-up on discharge side of turbine pump.

added, permit alternate operation of each pump, and when an excessive amount of condensate is returned, both pumps will operate simultaneously until such time as condensate return becomes normal.

Both horizontal and vertical types of condensate return units are available for large or small applications, from the small, low pressure job (10 to 40 psi) where equivalent direct radiation is from 1,000 sq ft or less, up to the high pressure job where maximum EDR is 100,000 sq ft. If the return is too low for a horizontal unit, the task is given to a vertical unit with pump and tank below floor level, and motor above.

Boiler Feed Return Units. Turbine type pumps feeding water against pressures up to 200 psi in boiler return systems are found in laundries, dry cleaning plants, dairies, creameries and other users of process steam where make-up water is essential due to the large amounts of steam exhausting to atmosphere. Make-up water is added through a special valve installed in the tank and connected to the water supply line. A float in the water tank automatically actuates this valve. But it is the water level in the boiler that controls pump operation through a liquid-level controller which often incorporates a low-level alarm. Single pumps are generally used for pressures below 75 psi, and two-stage pumps serve for pressures from 75 to 200 psi. For high pressure at low speed, there are available four-stage pumping units that pump from 5 to 150 gpm at pressures up to 300 psi. Figure 8 shows a typical arrangement of a boiler return system using a turbine type pump, and a boiler which is automatically supplied with water by the pump.

Water treatment compounds should never be added on the suction side of a turbine pump, because they can damage the pump parts. Such material can be added through piping between pump and boiler. A typical hookup for feeding compounds into the discharge of a feed pump is shown in Fig. 9.

Air Conditioning and Refrigeration. Along with ability to handle high heads encountered, for example, in cooling tower applications, the turbine type pump provides other important advantages. One is the use of mechanical seals instead of packing to provide positive prevention of leakage. On some turbine pumps, mechanical seals suitable for temperatures from —80 deg to +400 deg come as standard construction. Another major advantage of the turbine pump is its close running clearance without metal-to-metal contact, in contrast with pumps that depend on contact between rotating parts for efficient operation. This is a big advantage because most refrigerants are poor lubricants. Equally important is the ability of a turbine type pump to handle vapor and liquid together, without becoming vapor bound. This feature makes the turbine pump ideal for handling Freon and Genetron compounds, anhydrous ammonia or any other refrigerant or liquid that has a low boiling point.

Corrosion of Gas-Fired Domestic Water Heaters

A study, under the sponsorship of the American Gas Association, was made to determine the factors which influence corrosion of domestic water heaters. Waters used in this study were Cleveland, Ohio, tap water and that obtained by passing Cleveland tap water through a gel type water softener.

The studies revealed some interesting data. For example, when a constant volume of water is withdrawn daily from tanks of the same style but of different volume, the corrosion rate per unit tank area is greatest in tanks of smallest volume. The corrosion intensity was 1.8 times greater in 20 gal tanks than in 50 gal tanks. In both cases, the tanks were tested with either softened or unsoftened water at 160 deg F.

Another factor is the temperature at which the tank operates. After 635 days of operation, galvanized steel tanks tested at 140 deg showed essentially no corrosion when evaluated by the number of rust tubercles formed during that time, while tanks operated at 150 deg or higher, corroded and showed larger numbers of rust tubercles.

Using Cleveland tap water, dissolved oxygen analyses showed that corrosion is 1.56 times faster at 150 deg than at 140 deg; 1.86 times faster at 160 deg than at 140 deg; 2.42 times faster at 180 deg than at 140 deg. Using zeolite-softened Cleveland tap water, the corrosion is 1.65 times faster at 150 deg than at 140 deg; 2.15 times faster at 160 deg than at 140 deg; 2.7 times faster at 180 deg than at 140 deg.

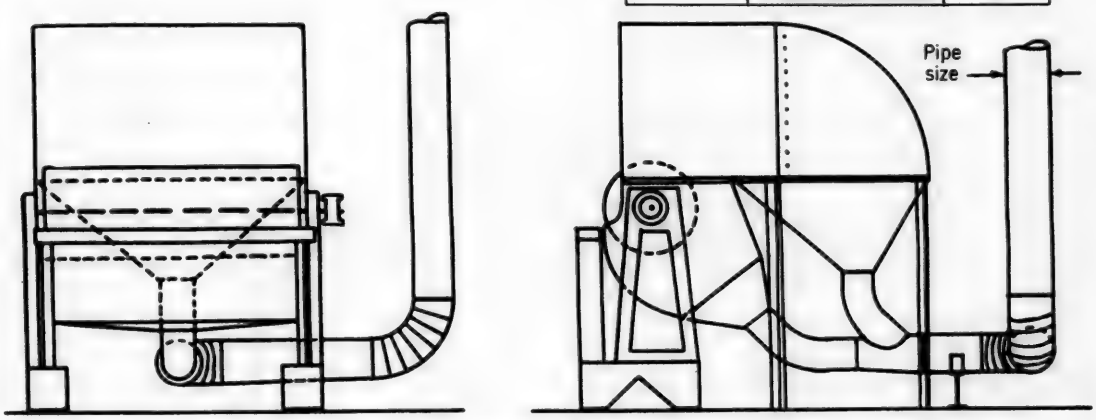
Water heaters were corroded at a faster rate by zeolite-softened water than by unsoftened water. The corrosion rate by softened water was from 1.2 to 1.4 times faster than by unsoftened water. The relative corrosion rates by the two waters was a function of the water temperature.

The total amount of oxygen consumed by metal corrosion of tanks having three ounces of galvanizing metal per square foot was always less than for tanks of similar style having two ounces of galvanizing metal per square foot when tanks were operated at corresponding temperatures in water at the same composition.

The corrosion rate of galvanized steel tanks by hot water was approximately 10% greater in tanks with copper dip tubes than with non-metallic dip tubes.

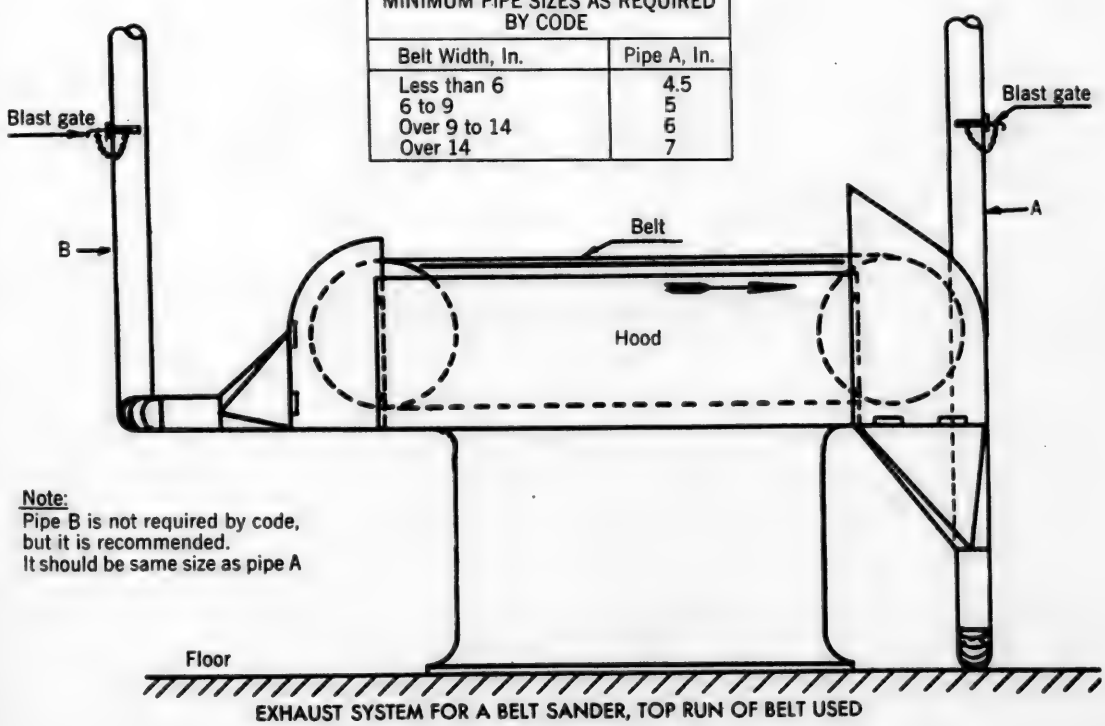
EXHAUST SYSTEMS FOR SANDERS

MINIMUM PIPE SIZES AS REQUIRED BY CODE		
Drum Dia, Inches	Working Surface, Sq In	Pipe Size, Inches
Up to 10	Up to 200	4
Over 10	Up to 400	4.5
	Over 400 to 700	5
	Over 700 to 1400	6
	Over 1400 to 2400	7



EXHAUST SYSTEM FOR A DRUM SANDER

MINIMUM PIPE SIZES AS REQUIRED BY CODE	
Belt Width, In.	Pipe A, In.
Less than 6	4.5
6 to 9	5
Over 9 to 14	6
Over 14	7

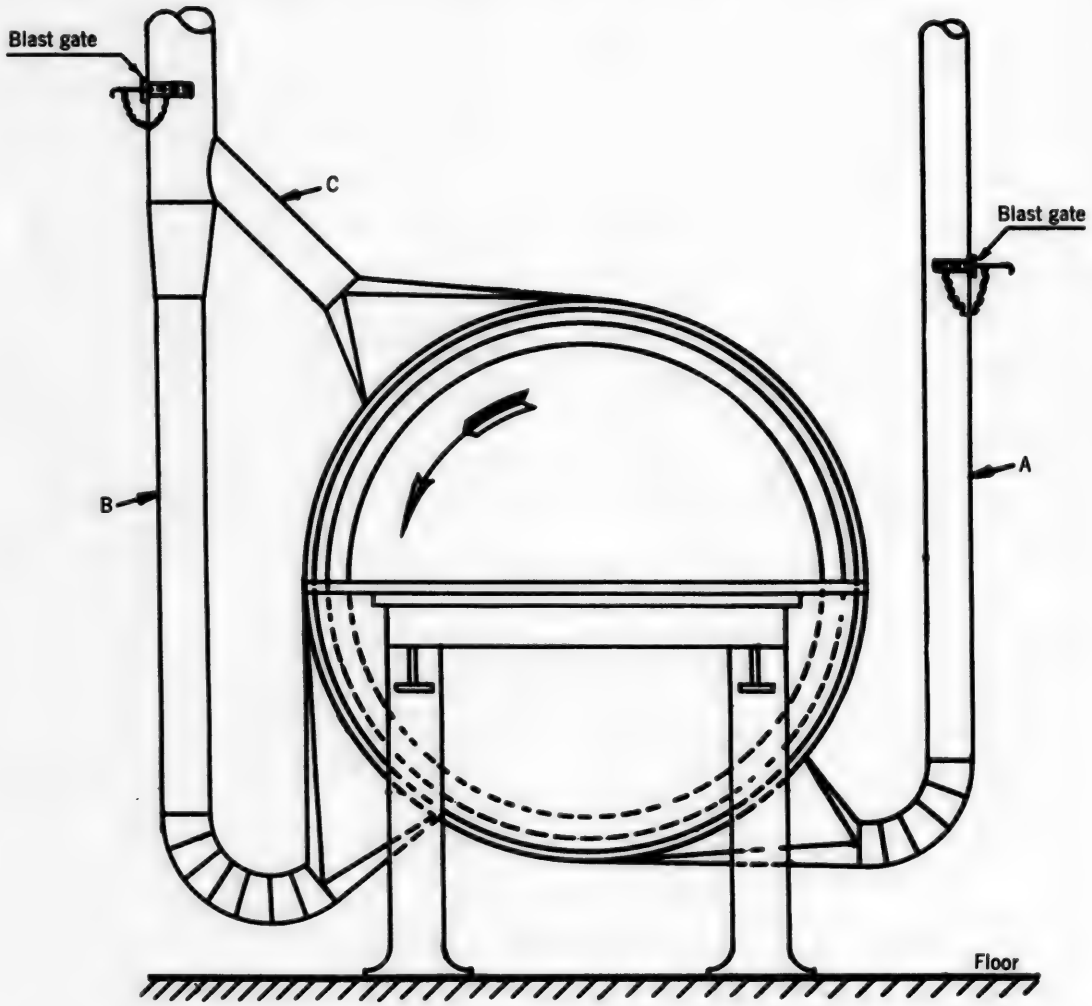


Note:
Pipe B is not required by code, but it is recommended. It should be same size as pipe A

EXHAUST SYSTEM FOR A BELT SANDER, TOP RUN OF BELT USED

Drawings Through Cooperation of New York State Department of Labor
Division of Industrial Hygiene—Engineering Unit

EXHAUST SYSTEM FOR DISC SANDER



MINIMUM PIPE SIZES AS REQUIRED BY CODE			
Disc Dia Inches	Diameter, Inches		
	A	B	C
Up to 12	4	–	–
Over 12 to 18	4.5	–	–
Over 18 to 26	5	–	–
Over 26 to 32	4	4	–
Over 32 to 38	5	4	–
Over 38 to 48	5	4	4

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Division of Industrial Hygiene—Engineering Unit

AIR CONDITIONING, HEATING AND VENTILATING'S

Reference Section

Components of High Temperature Water Systems

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Related control and distribution equipment used in high temperature water systems

AIR CONDITIONING, HEATING AND VENTILATING — MARCH, 1957

Components of
High Temperature Water Systems

OWEN S. LIEBERG
Consultant, Cosentini Associates, New York, N. Y.

As a follow-up to the Reference Sections by Mr. Lieberg on High Temperature Water in the September and November, 1955, and January, 1956, issues of this publication, the author here discusses in further detail certain equipment used in these systems, including combustion controls, distribution piping, system circulation pumps, and control valves.

The term high temperature water refers to water which is heated to a temperature above its normal boiling point of 212 deg F at atmospheric pressure at sea level by maintaining a created or imposed pressure on the generating system in excess of the saturation pressure of water at the required temperature.

Heating systems based on the use of high temperature water, widely used in Europe for years, have become accepted in this country as an efficient and economical method of providing space and process heat to factories, public institutions, housing developments, government defense areas, and other establishments. High temperature water has been found especially economical as applied to district heating for the transport of heat to groups of buildings spread over many square miles in area.

COMBUSTION AND OTHER BOILER CONTROLS

Generally speaking, high temperature water systems and steam generating systems require the same combustion controls to regulate fuel-air flow conditions. Simplicity should be the keynote, and superfluous instruments and controls should not be installed in the hot water system any more than the practical engineer would use them in steam generation.

Where a common steam-pressurized expansion drum is used for one or more high temperature hot water boilers, the master regulator controls the pressure within the drum by regulating the active boiler or boilers in parallel.

With oil or gas fuel, the air flow to each boiler unit is measured and controlled by the master regulator, and the air-flow will proportion the fuel flow to the boiler as diagramed in Fig. 1.

With coal firing, a Btu meter has definite advantages. As the steam flow meter controls air flow on a steam producing boiler, the Btu meter functions similarly on the combustion control system for hot water generation. The master regulator controls fuel firing to regulate and maintain the pressure in the steam-pressurized expansion drum. The Btu meter should control the air flow to the hot water boiler unit as illustrated in Fig. 2.

Only the best and most reliable air-flow measuring instruments should be specified and used. One type of meter will not only record relative air-flow, but will also record the Btu output of a boiler unit and will generate a pneumatic signal proportional to this output. Temperature difference is obtained by thermocouple measurement of the inlet and outlet water temperature of the boiler. Feedwater flow to each boiler is measured in lb per hour. Through multiplying linkage within the meter the temperature difference is imposed on the feedwater flow measurement and the product is recorded on the chart as Btu output.

If coal is the fuel being used, a constant, negative furnace draft is necessary to protect the fuel firing equipment. Furnace draft control is regulated by an instrument sensitive to furnace draft and able to correct any departure from the desired value. An uptake damper regulator or operator receives the signal and will operate the damper in accordance with the signal received, thus maintaining furnace draft at a desired constant.

For oil firing, a regulator will meter the air flow across the wind-box and generate a pneumatic signal in proportion thereto. The signal is sent to the oil control valve through a manual control station to establish oil flow in accordance with the air available to burn it. The generated signal will bear a straight line relation to air flow and will show a percentage of maximum burner capacity.

The formation of steam in the boiler, or for that matter in any part of the high temperature water system, with the exception, of course, of the expansion drum, must be prevented. Steam flashing produces water hammer and, what is more important, will cause an error in the Btu meter because the meter is not capable of recording the latent heat in the steam. It is therefore the responsibility of the plant operator to make the necessary manual adjustments to the control system in order to prevent steam formation and to have the plant load equally divided among the operating boilers.

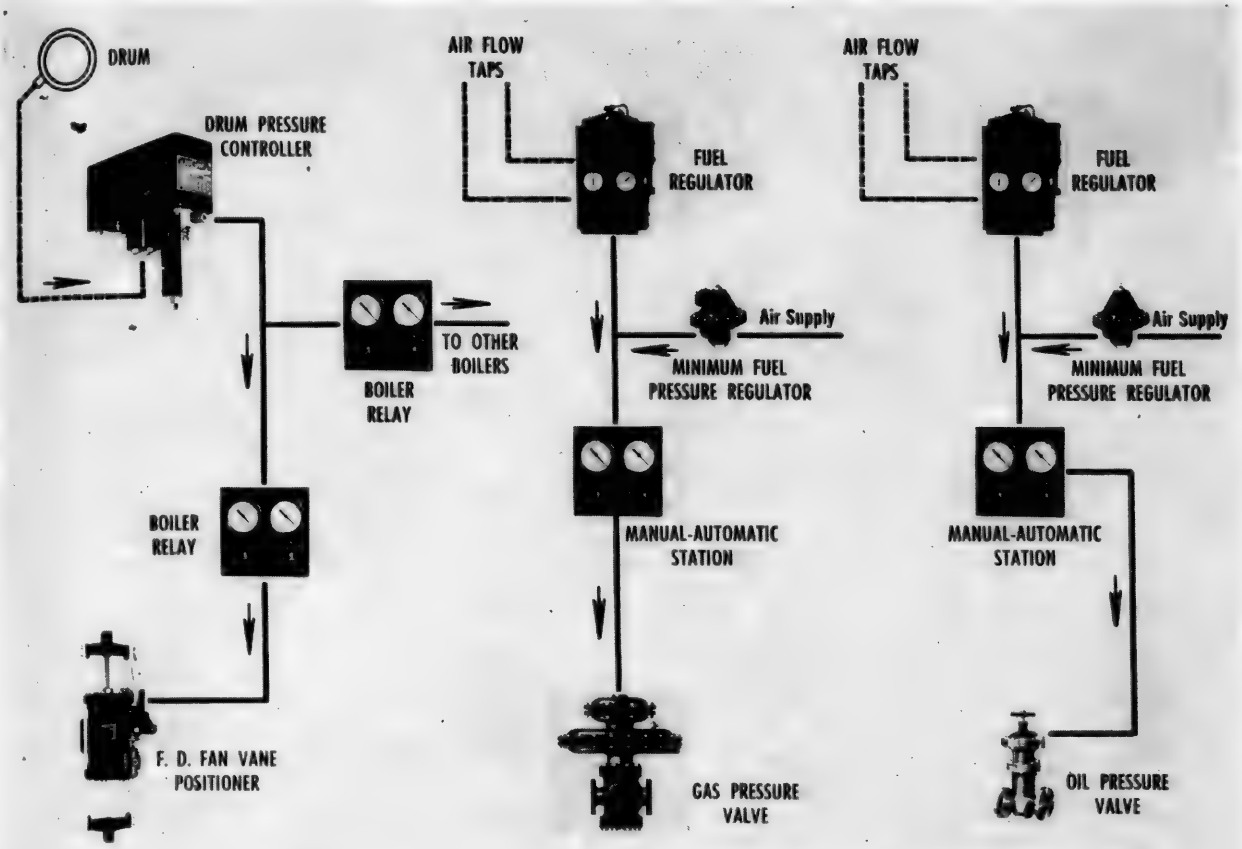


Fig. 1. Combustion controls for gas and oil-fired high temperature water systems. Illustration, Hagan Corporation.

When an additional boiler is started up and about to be put on the line, it is recommended that all operating boilers should be placed on manual control, until the added boiler is delivering hot water at the required temperature. Then, all boilers should be returned to automatic control in order that each boiler will equally share the total load.

Feedwater flow to each boiler unit should be recorded. The feedwater flowmeter on each boiler should be equipped with two mercury switches, one switch to be actuated to sound an alarm when a pre-selected low feedwater flow is experienced. This warns the operator to start additional water circulating pumps or take other suitable action to protect the boiler. If, in spite of such action by the operator, feedwater flow to the boiler still continues to decrease, the second mercury switch is actuated to shut the unit down automatically.

The expansion drum must be properly sized for the heating system, and close control between the system pressure, the level of the liquid in the expansion drum, and the rate of firing of each boiler is essential at all times. The master controller or regulator will ensure that the system is maintained at a predetermined constant pressure.

Water Level Control

Water level may be controlled by use of a recording meter equipped with five mercury switches located within the meter case, the switches being actuated by the movement of the meter recording pen. Through suitable pressure connections the meter is made sensitive to the level of water within the expansion drum. To illustrate the function of this meter and its mercury switches, the following is a typical example. For other installations, the levels will be different but the functions that are to be performed by the mercury switches and their accompanying relays will be the same. All levels are measured from the bottom of the drum.

Should water level in the expansion drum reach a high point of +57 in., a mercury switch in the meter will be actuated. This will open a diaphragm-operated cold water valve and, in addition, through an adjustable time delay relay, will open an expansion drum blowdown valve to allow the surplus hot water in the expansion drum to overflow into the blowdown line. The hot and cold water from these valves should discharge into a mixing chamber which discharges the mixture to the hotwell. Cold water is used to prevent flashing.

When the water in the drum reaches +53 in., both valves will be closed and not reopened until the level again reaches +57 in.

Should the water level drop to +18 in., a contact will be made which will ring an alarm and start an emergency make-up pump if one is available. If there is no such pump the contact may be used to shut the plant down.

The make-up pump, which is normally used, is of small capacity. As the water level rises to +30 in., the

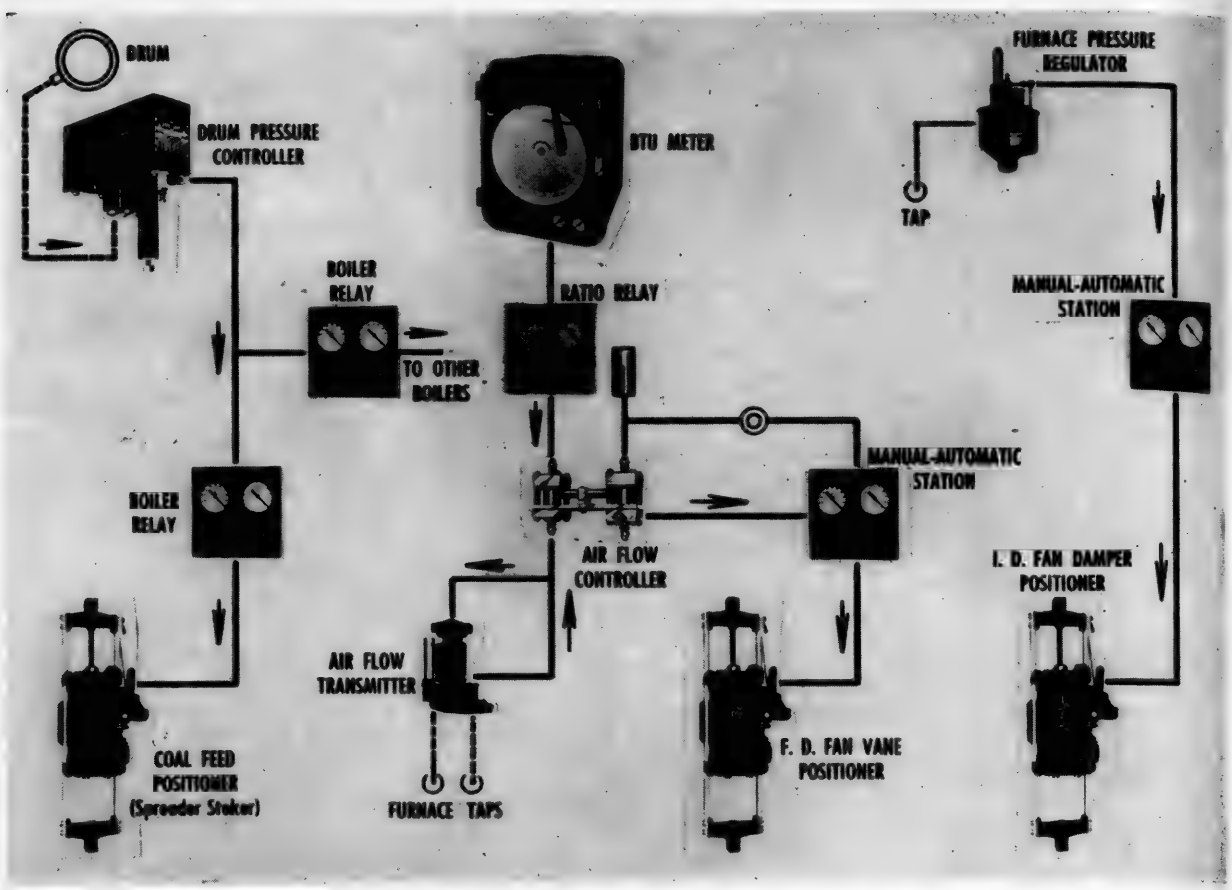


Fig. 2. Combustion controls for coal-fired high temperature water systems. Illustration, Hagan Corporation.

emergency pump would be stopped and the regular make-up pump started. This pump should be kept running until the water level reaches +40 in., at which point a mercury switch would stop the make-up pump.

From the preceding description it is apparent that wide water level variations can be permitted before blowing down the expansion tank or before starting make-up pumps.

PIPING, CONDUIT, PREFABRICATION AND INSULATION

The installation of distribution piping in the field is of greater significance than is often realized; this is particularly true in high temperature water systems. First cost, maintenance, and operating costs can vary considerably depending on the type of product, its installation, supervision, and the soil conditions. Of these, perhaps soil conditions have the greatest bearing on the satisfactory operation of the system over the years. The following types, which do not include all, are indicative of the different designs from which engineers may choose. Each has advantages and disadvantages, some are lower in first cost, some have higher maintenance costs, while some cannot be used where surface water is a serious problem. The following are cited as examples:

1. Prefabricated insulated pipe units.
2. Piping laid in molded concrete.

Prefabricated Insulated Pipe System

This type of pipe unit, illustrated in Figs. 3 and 4, comprises an outer casing or conduit protecting the insulated pipe within and having pipe supports spaced according to requirements due to the size of the pipe and the number of pipes carried within the same conduit. These prefabricated pipe units are only satisfactory so long as the outer casing or conduit resists corrosion and deterioration due to soil conditions and so long as the pipe inside remains well insulated and protected from the stresses set up by operating conditions.

Prefabricated insulated pipe units, factory built for shipment to the site where they can be welded together into one continuous run of pipe, are insulated and reinforced, protected from ground water, and supported without interfering with expansion and contraction. The essential requirements for this type of pipe distribution is satisfactory field work in the joining of the individual lengths, so that the collars at the conduit ends are left completely watertight not only for a few weeks but for many years.

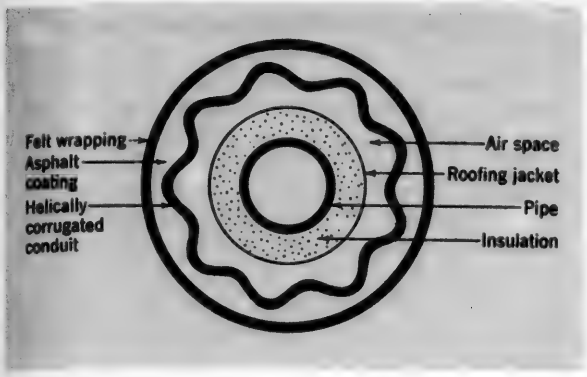


Fig. 3. Cross-sectional view of prefabricated insulated pipe system of Ric-wiL, Inc.

Molded-Concrete Pipe System

There are several types of molded concrete or similar materials which combine insulation and support. Most of these are cellular in formation, using the entrapped air cells to resist the flow of heat from the pipe. The monolithic insulation around the pipe tends to eliminate heat loss by convection.

The pipe or pipes are laid on supports in the removable forms which have been lined with waterproofing membrane as depicted in Fig. 5. After the concrete or concrete-type material has been poured, and has set, a permanent structure remains which, provided there are no subsequent distorted strains or cracks due to settlement, external stresses or unequal expansion, will provide high thermal efficiency at the high temperatures at which the water will be flowing.

Other Types of Pipe Systems

Among other types of pipe encasement is one which consists of a granular insulation which is shoveled or poured around pipes in a concrete slab trench, as illustrated in Fig. 6. The heat of the medium flowing through the pipes turns the adjacent insulation into a tough, semi-plastic waterproof zone of protection. And, in addition, there are tubular conduit systems consisting of tile or asbestos-fiber and cement, pressure-molded casings which contain insulated lengths of pipe (see Fig. 7).

Design Problems

Efficient design is not enough; the engineer must recognize that human error can spoil the best design. It is therefore imperative that the outside distribution lines be well supervised during construction, and protected both before and after completion of work. The prefabricated conduit type system must not be installed where surface water or a high water-table will cause corrosion either at the joints between the prefabricated lengths, or at the ends where they enter manholes or buildings. This applies especially to asphalt filled conduits.

Molded concrete must be well supported to prevent collapse or cracking, especially in filled ground or loose soil, or where conduits pass under roads where traffic is liable to add stresses not normally expected.

Expansion loops need special care in fabricating and construction in the field. Space for pipe expansion and contraction must be left within the concrete to provide free movement without impairing the efficiency of the insulation. This needs close attention by the supervising engineer. Some concrete materials provide good insulation but others have poor insulating qualities and are structurally weak.

Fig. 4. Expansion loop in prefabricated insulated pipe system of Durant Insulated Pipe Company. Note joint collars on top of ditch at right.

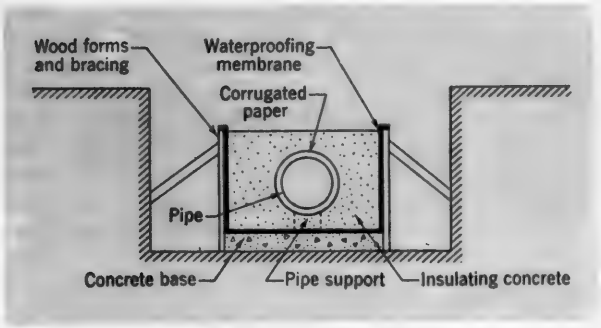


Fig. 5. Section of non-load bearing, molded concrete pipe system of S. E. Dockstader, Inc., during concrete setting period.

Pipe Expansion and Contraction

Whether to use an expansion loop or joint is a recurring problem on every project. Both have advantages and disadvantages and the selection must be governed by the conditions at the site, the application, and the specific requirements.

With standard Schedule 40 steel pipe welded throughout the distribution system, expansion and contraction with high temperature, high pressure hot water is no different than with high pressure steam under equivalent pressures and conditions. Piping used in expansion loops should be cold sprung, but the credit for cold spring should not exceed 50% of the total expansion.

Generally speaking, where space is not a serious matter as, for instance, in the exterior distribution system between buildings, and this applies to piping above or below ground, loops are preferred. Well designed and fabricated, a loop will give no trouble and should last indefinitely. No guides are required, alignment is not a critical problem, there is no multiplicity of elements, face to face relationship due to lateral and lineal movement can be ignored, and guide rods are not required. Yet, like all equipment used in the wide field of mechanical engineering, the expansion joint has a place, and an important place. Unequal expansion does not materially affect the expansion loop provided free expansion is insured, the piping well anchored, and the loop designed for the expansion calculated. The main objection to the expansion loop is the length of the lateral extension. Above ground, in between buildings, this will mean additional supports, while below ground the cost of excavation and preparation of concrete boxes adds considerably to the cost of installation.

It is because of the lateral space required for the expansion loop that the expansion joint was originally developed. In tunnels or restricted spaces, as for instance in the central boiler plant, and in factories where other equipment, machinery, or pipework precludes the use of the loop, the expansion joint is valuable. The essential design factors for the satisfactory installation of the expansion joint are:

1. Correct positioning of guides.
2. Careful placing of anchors.
3. Calculation of stresses.
4. Relationship of axial to lateral movement, if any.
5. Effect of axial, angular and transverse movement.

First cost is not always the last cost and the engineer should carefully examine the various designs of expansion joints. Joints should never be installed where flooding might occur and cause unequal expansion of metal between, for instance, the lower and upper portions of the joint. Emphasis cannot be too strongly made on the correct use of guides. The satisfactory performance of the joint will depend on the care taken in the alignment of the pipe between the guides. In the well-designed high temperature water system the foregoing stipulations and design factors are not difficult to contend with providing each factor is studied and anticipated.

The use of an internal sleeve limits motion and provides a safety factor and is recommended. Sleeves are designed to prevent over extension and compression when subjected to the full end thrust resulting from the working pressure. The bellows type has been used very successfully with high temperature water; and the design will vary from the multi-disc stainless steel type to the corrugated design. The engineer must select the joint best suited to his budget and conditions of operation.

Fig. 6. Granular insulation being shoveled around distribution pipes in concrete slab trench for high temperature water system at New York International Airport. Photo, American Gilsonite Company.

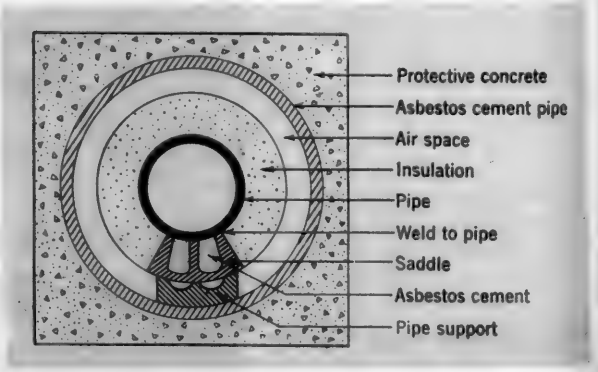


Fig. 7. Cross-sectional view of Johns-Manville tubular conduit pipe system showing pipe expansion facilities through use of pipe saddle and support.

A pump having a flat curve characteristic is always preferred for high temperature water distribution. It maintains a better balance between capacity and total head. The curve illustrated in Fig. 8 is comparatively flat up to 800 gpm and will maintain almost a constant total head of 100 feet with a 15-in. dia impeller. The smaller 13½ and 12-in. dia impellers are also comparatively flat in the same range of 0 to 800 gpm but at the lower total heads. Even above this capacity range from 800 to 1000 gpm, the curves are sufficiently flat for all practical purposes.

Any pump with steep curve characteristics should not be selected for high temperature water heating systems. Pumps should be carefully selected to meet the specific requirements of capacity, head and speed in relation to horsepower and other economical factors. Operation, maintenance and replacement costs are of greater importance to the engineer than cheapness in first cost. Since low net positive suction heads are to be expected in most high temperature water systems, the design of the pump suction is important and pumps should be carefully compared before a selection is made. Cavitation at the suction inlet can have serious effects on the operation of the pump at the high pressures at which the pump will be working.

Construction

Pumps should be standardized on the following construction:

Casing and Head—Cast steel or cast iron with a high tensile strength.

Impeller—Chrome steel or high tensile ferrous alloy.

Shaft—Stainless steel.

Sleeves—Chrome steel or steel alloy.

Bushings—Chrome steel.

Bearings—Ball bearings, oil lubricated.

The coupling should be designed to permit dismantling of the pump without breaking the suction or discharge piping.

Pump Seals

Pump seals are important at the pressure and temperatures at which the average high temperature water system will be operating. While packed stuffing boxes are not condemned, the use of mechanical seals for the higher pressures is strongly recommended. The design of mechanical seals has advanced rapidly in recent years. It is highly efficient and very effective for the duty required and has proved superior to the conventional asbestos or metallic stuffing box packing. For high temperature water, the mechanical seal is the only satisfactory way of sealing a centrifugal pump stuffing box. Mechanical seals are especially suitable where pressures and shaft speeds are extremely high, or where corrosive conditions exist. The mechanical seal will reduce leakage to a minimum and will operate over long periods without the deterioration of the conventional packing.

Various mechanical seal designs are available for sealing centrifugal pump stuffing boxes and should be selected by the conditions of service. The reputable pump manufacturer will always assist the engineer in his decision. The cooled gland is recommended for pumping temperatures of 400 deg F and over. Finally, mechanical seals should be installed at the factory and tested by the manufacturer. Mechanical seals, properly installed will give long and trouble-free service.

The following are usual causes of leakage between mechanical seal faces and the failure of mechanical seals, and are reasons why it is important that seals should be fitted by the pump manufacturer or under expert supervision:

1. Gland bolted up unevenly.
2. Seal ring binding.
3. Seal faces worn.
4. Shaft misalignment.
5. Foreign particles between sealing faces.
6. Loss of spring compression.
7. Stationary insert face not perpendicular to shaft axis.

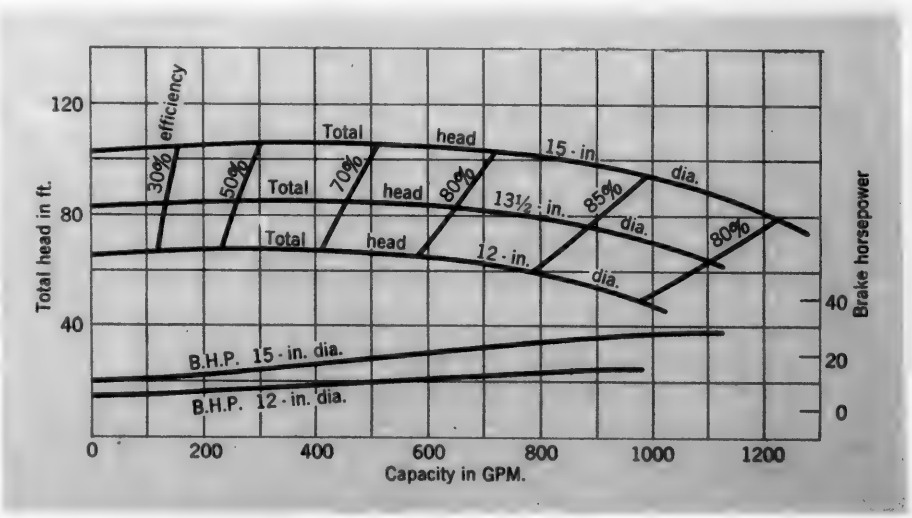


Fig. 8. Characteristics of 6-in. discharge and 8-in. suction, single stage system circulation pump at 1150 rpm. Drawing based on curves by Dean Brothers Pumps Inc.

The control of the flow of high temperature water from the boiler through the district circulating pumps, into the distribution system and the various heat consuming and space heating units, and finally back into the boiler again is an important factor, since it involves technical and financial considerations which will have a direct bearing on the satisfactory operation of the high temperature water system. These technical aspects will be examined with each type of valve and fitting, bearing in mind the relation of first cost to operating costs, replacements and renewal of parts, simplification of the unit, and other factors. The advantages and disadvantages of each depend a great deal on the duty and application involved.

Materials

The comparatively high pressures at which high temperature water systems operate, while considerably higher than the low pressure hot water heating systems generally in use, should not be considered differently from steam systems of equivalent pressures. Valves designed for steam pressures of 150, 200, or 250 psig will be used for high temperature water. The design or test pressure of any valve is much higher than its operating pressure, so that any steam valve sold for a nominal 150 psig can be selected for the high temperature water system operating at 350 deg. For high temperature water systems operating at 400 deg, and where process heating by steam or hot water is required as in the plastics or chemical industries, valves must be of the 300 pound class.

Generally speaking, valves for high temperature water are restricted to the 150 and 300 pound class with preference for the former on account of cost. It should be again emphasized that unless higher pressures are required, high temperature water systems for all forms of space heating should be limited to from 325 to 340 deg or pressures below 150 psig.

Gate valves are generally preferred for isolating lines, particularly in the boiler house where complete shut-off is essential. Below 150 psig, the valve body should be cast steel with trim of anti-corrosion alloy. For 300 psig, the same materials should be specified.

Globe valves should invariably be used where control of flow is necessary. Below 150 psig, the valve body can be iron and the trim of anti-corrosion bronze alloy. Globe valves operating from 200 to 250 psig (of the 300 pound class) should be specified with cast steel body and stainless steel trim.

Check valves, below 150 psig, should have an iron body, bronze trim; above 150 psig, cast steel body and stainless steel trim.

Safety valves should be specified with carbon steel body and stainless steel trim for all operating pressures.

By-pass valves, temperature control valves, blow-down valves, and valves used for similar purposes should be globe valves and materials specified according to the pressures under which they will be operating.

Air vent valves and test gauge cocks should be of bar stock construction, with a carbon steel needle.

Plug cocks, below 150 psig, should have an iron body and malleable plugs; for 300 psig, cast steel body and malleable plugs.

The corrosive action of high temperature water increases as the pressure and temperature increase due to the more rapid absorption of oxygen. It is therefore an advantage to use oxygen-free nitrogen as the compression medium, thereby eliminating as far as possible any oxygen absorption. The importance of well-made tight-fitting valves cannot be overstressed since it is at the valves that most leakage occurs.

This leakage, in the form of flash, is imperceptible except for subsequent deposits of scale or salt-formations on the valve stem. Stainless steel and other alloys of bronze which are corrosion proof are essential in all high temperature water systems.

Since this section is limited to the equipment used in high temperature water pipe lines, combustion or boiler control valves are not specifically included.

Automatic Control Valves

Automatic control valves directly controlling the flow of high temperature water to heat exchangers, space heat-

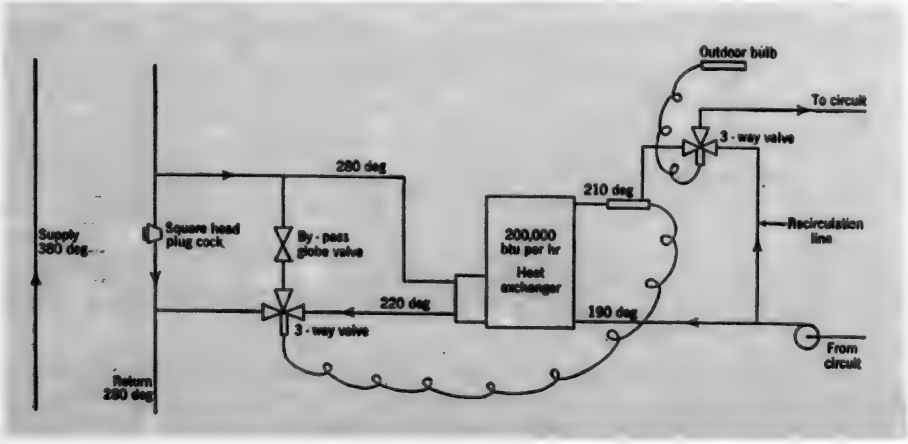


Fig. 9. Modulating valve control of convector heating circuit through heat exchanger connected in return of high temperature water system.

ing units, and process-heating equipment are divided into two different categories, positioning and modulating. Both of these groups can be sub-divided into 2 or 3-way valves; the former being the *on - off* type while the latter is provided with a by-pass to divert the high temperature water from the unit when heat is not required.

One of the main advantages of the high temperature water system is the availability of heat to meet varied requirements at different locations over a wide area from the same single distributing source. Steam, from 10 pounds to any pressure up to, say, 150 psi, can be provided, through the use of heat exchangers or converters, in any quantity without the fear of sudden drops in pressure. Similarly, hot water requirements, for degreasing tanks, dishwashing, showers and lavatory basins, process work in the factory, and so on, may all be met from the same distribution system by the simple use of temperature control regulating valves and heat exchangers.

Positioning valves while being cheaper in first cost are apt to cause over-riding of temperature conditions which can at times cause complications, especially in secondary circuits which are being operated at lower temperatures ranging from 190 to 210 deg. Positioning valves in the high pressure, high temperature line to the heat exchanger can, if not installed with safeguards, produce water hammer.

Under normal working conditions therefore, the use of modulating valves to control the flow of high temperature water from the primary circuit of the heat exchanger is always preferred; water hammer is precluded and overriding minimized to almost negligible limits.

To illustrate the application of high temperature water to a heat exchanger supplying low temperature water for convector or radiation heating, as in the office section of a factory, Fig. 9 is a typical example.

For economical reasons, the heat exchanger can be connected into the return line of the system since the secondary circuit will be operating at much lower temperatures than the supply line of the high temperature water system. The primary flow to the heat exchanger is modulated by the 3-way valve actuated by the temperature of the supply water in the secondary circuit flowing to the convector or radiation heating lines. When the convector circuit is satisfied by reaching the maximum required temperature, the primary flow is by-passed through the 3-way valve back into the main high temperature water return system. A square head plug cock and by-pass globe valve are used to balance the unit. This is important when there are a number of space heating or heat consuming units on the line.

On the secondary, convector circuit the 3-way mixing valve is in turn controlled by an outdoor bulb. The proportioning type valve modulates the convector heating system water temperature according to outdoor temperature through an auxiliary control panel. Should the indoor temperature exceed the setting of a room thermostat or other indoor control, an electric circuit is closed to a heater element wound around the auxiliary bulb in the panel. The auxiliary bulb which forms a common system with the outdoor bulb and the sensing thermostat in the 3-way valve, resets the proportioning valve to deliver cooler recirculated water and so check overheating. Temperatures of the blending water may be adjusted manually.

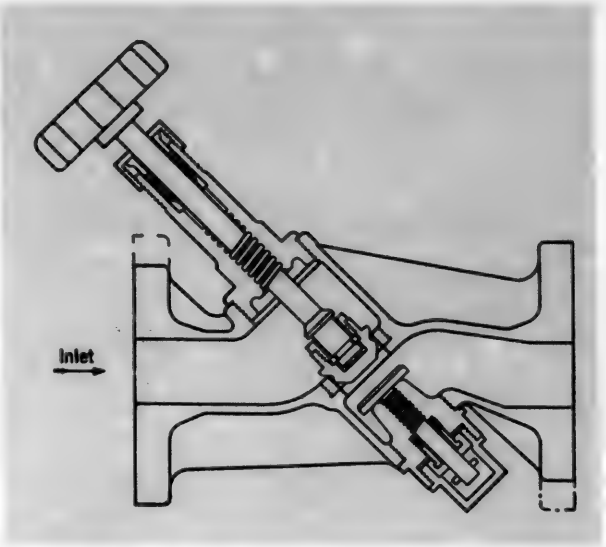


Fig. 10. Dual-valve, manually-operated flow regulator made by Dewrance Company (England) for low-friction balancing of branch lines in high temperature water systems.

These self powered temperature regulators can also be designed for other applications where heat exchangers are employed. They are self contained, rugged, and have no exposed mechanism. They can be used with equal efficiency for temperature control of liquids or air.

Manual Control Valves

Of particular interest is the manual flow regulating valve, illustrated in Fig. 10. This valve, originally developed in England over 15 years ago, is widely used in Europe for controlling the flow of high temperature water in distribution lines. The valve was designed especially for high temperature water systems.

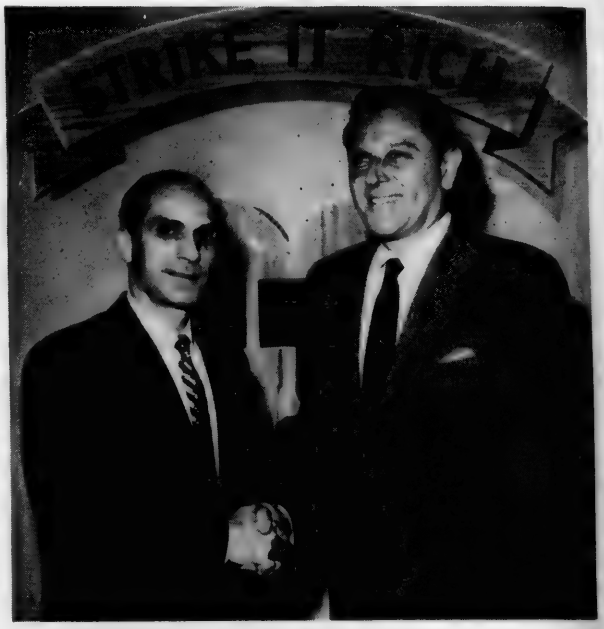
The body is designed to reduce head loss to a minimum and the direction of flow arranged so that the pressure is on top of the shut-off valve disc and assists in keeping it tight when shut. A chamfered collar on the spindle forms a seat on the underside of the cover when the valve is fully open permitting the gland to be repacked while the valve is under pressure. Special packing rings are employed to eliminate gland leakage.

The valve can be used to regulate the flow of fluid while retaining the means to shut off or reopen the valve without destroying the set regulation. The unique construction includes an auxiliary regulator which is independent of the main valve and can be adjusted while the valve is in service. The regulator is fitted with a stuffing box and a screwed gland and is totally enclosed in a screwed cap.

Where several branch or lateral lines are taken from the same supply and return lines, accurate balancing is permanently possible. Once the supply of hot water has been regulated to the branch line by adjusting the lower auxiliary regulating valve, the lower valve can be locked permanently to prevent unauthorized interference, and the upper valve used for isolating purposes only.

An air conditioning spray coil, using 50,000 ft of copper tubing and 208 sq ft of face area, has been developed by The Trane Co., for use in the Hudson Eastland Shopping Center in Detroit. Shown in process of fabrication, the coil, one of five such units which will deliver 500,000 cfm when installed, has 8 coil banks and employs over 300 spray nozzles.

Picture Paragraphs



Warren Hull, right, host of CBS Radio's "Strike It Rich" weekday program, congratulates Salvatore Giordano, president of Fedders-Quigan Corporation, who successfully answered questions posed when he acted as proxy contestant for an invalid in Georgia. Mr. Giordano, born of immigrant parents in Brooklyn, began work as a floor boy with the Quigan Co., then manufacturers of handbags and purses. He became vice president of the company in 1934, and president in 1945 when the company purchased Fedders Corp. He created and heads the philanthropic Salvatore Giordano Foundation.

1000 sq ft of continuous aluminum insulation, 3 blocks long, feeds out of a small 55 lb carton. Manufactured by Infra Insulation Inc., it is easily installed in one long piece for heat and vapor protection in new and existing buildings, thus reducing the number of vapor breaks occurring.

Thermostatically-controlled showers are now enjoyed by gorillas at Chicago's Lincoln Park Zoo. According to Zoo Director Marlin Perkins, showers keep the animals clean and improve the sheen of their coats. Inset shows Keeper Leroy Hoff turning on the hot and cold water mixing Hydroguard, made by Powers Regulator Co., Skokie, Ill. The device instantly turns off shower if either cold or hot water supply fails, thus guarding the valuable animals from scalds or chills.

A contented sow mothers her young amid cool surroundings in the air conditioned Reish hog barn near South Bend, Ind. Before air conditioning, heat-weary sows smothered many of their pigs. Part of the Carrier 10-ton installation, consisting of two condensing units, two fan coils, and a cooling tower, looks down on the litter which, in 65 deg F surroundings, will require less feed and time to be fattened for market. The air conditioning approach was fostered by studies at Purdue University and University of California where it was discovered that hogs kept in comfort-controlled climates required less feed to attain marketable weight.

Collector's item (below), a Crosley Icyball Refrigerator, which was the earliest household refrigerating unit to replace the use of ice, has been acquired by the Recold Museum of Air Conditioning and Refrigeration Equipment, reports H. T. Jarvis, Museum founder and president of Refrigeration Engineering, Inc., of Los Angeles. To operate the device, aqua ammonia is placed in the Icyball unit and the outer, or hot, ball is heated, driving the aqua ammonia over to the inner, or cool, ball. The unit is then placed in the refrigerator cabinet where the evaporation of aqua ammonia refrigerates foods for 12 hours.

LOUIS BLENDERMANN ON

PIPING AND PLUMBING

Balancing Service Hot Water Systems

OF all the systems installed in a building, the service hot water system, often requires the greatest amount of adjustment before it finally delivers water at a uniform degree of temperature to all the fixtures in the building. Unless the service hot water system is completely balanced, it is not unusual to have an ample supply of hot water in one portion of the building and an inadequate amount of hot water in another.

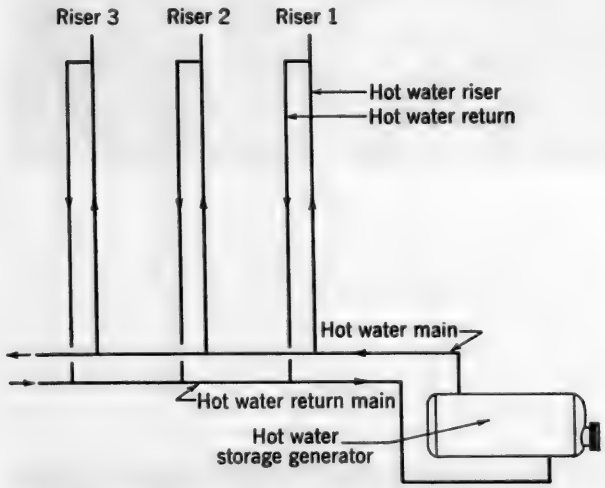


Fig. 1. Piping hookup shows how hot water circulates through a piping distribution system.

There are a number of factors that affect the operation and efficiency of a service hot water system, and the factor that can ensure a balanced system is proper circulation. The purpose of this article will be to discuss service hot water systems of varying sizes and to point out the means that may be employed to furnish the even distribution of hot water throughout the building.

Principle of Hot Water Circulation

Heated water rises. When the water in a service hot water system is heated, it also rises as illustrated in Fig. 1 which depicts a hot water storage generator and the distribution piping. The storage generator is the means for heating the water. The heated water then passes into the hot water main and up into the hot water risers to supply the various plumbing fixtures. The hot water return permits the water to circulate throughout the entire system. Moreover, the return line conducts the water back to the storage generator where it is reheated. When properly installed, a system of this type will operate with a good deal of efficiency.

For the sake of example, only three risers are shown, labeled 1, 2, and 3. Riser No. 1, offers the path of least resistance to the flow of water, therefore, the water will circulate most rapidly through this riser. Riser No. 2, offers the second path of least resistance and riser No. 3, the next. If more risers were shown, the rate of flow would decrease proportionately. Thus, in a system containing many risers, unless adequate controls are provided, the first riser could easily short circuit the system and deprive the succeeding risers of adequate circulation.

Typical Upfeed System

Figure 2 shows a system capable of serving three stories of fixtures. Water heated in the storage generator will circulate up through the hot water risers and return back again to the storage generator via the hot water return piping.

In this system, too, the first riser represents the path

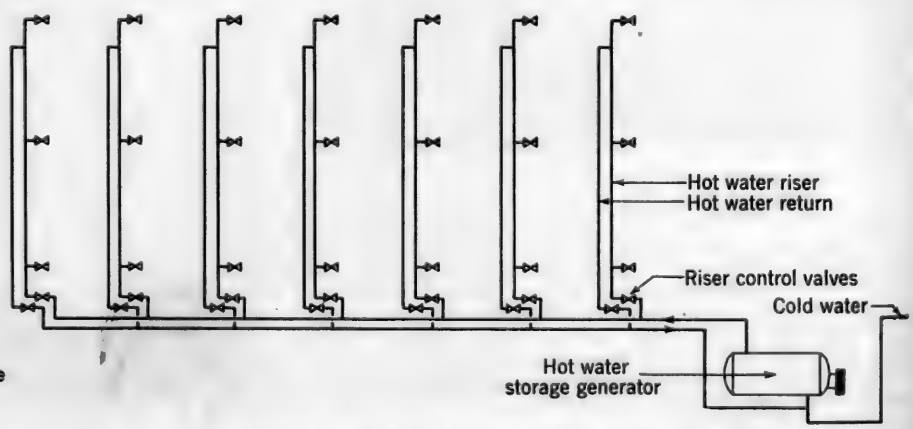


Fig. 2. Typical upfeed service hot water system.

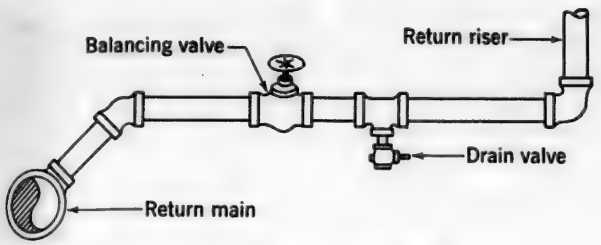


Fig. 3. Installation of a balancing valve.

of least resistance. Even though this system consists of but a few risers, the riser farthest from the storage generator will not receive the same benefit of hot water circulation as do those risers that are nearer to the storage generator. Since there are but a few risers involved, it is doubtful that there will be much of a temperature differential between the first and last risers. However, to make certain that the system operates as a balanced one, globe or balancing valves are placed at the base of each of the hot water return risers. This valve, in addition to serving as the shut-off valve for the riser, also is the means of balancing the entire system.

With the proper throttling of each valve, the rate of flow in the return risers can be adjusted to favor those risers through which adequate circulation is more difficult. Actually, the valves on the risers nearest the storage tank are partially closed to retard the circulation. Each valve is progressively adjusted to favor those risers through which adequate circulation is more difficult. This flexibility permits an even distribution of hot water for all the risers.

For the sake of clarity, the circulating pump, valves and other controls, normally included as component parts of the hot water storage generator have not been indicated in Fig. 2, or any of the other illustrations.

Valve Arrangement

The arrangement of the balancing valve on the return riser would be similar to that shown in Fig. 3. The valve is placed on the horizontal branch from the hot water return main. The drain valve shown between this valve and the riser is used in the event that it becomes necessary to drain the water out of the riser after it is shut off.

Enlarged Upfeed Systems

Figure 4 represents an enlarged version of an upfeed service hot water system. For such systems, where numerous risers are involved, it becomes even more important to consider the means that will ensure a balanced system. Balancing valves placed at the base of each hot water return riser are a necessity. Often, when many risers are contemplated, the valves alone may not be sufficient to balance the distribution system. In this event, a reverse hot water return main can be quite beneficial. Here the direction of the hot water return main is reversed as shown to assist those risers farthest away from the hot water storage generator. For each riser the total length of the supply line and return is the same.

The risers nearest the storage generator will of course be first to receive the hot water from the main. The returns for these risers however, will be the farthest from the storage generator. This means that the return for the hot water riser at the end of the run will be nearest to the storage generator. As the water circulates through the return main, its passage stimulates the flow of water in each return riser thereby benefiting the entire system. Patented venturi fittings are often employed on the return main to serve as connections for the return risers. These fittings are designed to improve the circulation in the return risers.

More Extensive Systems

For systems that are even more extensive with regard to the number of risers involved, a method similar to that shown in Fig. 5, may be used.

As illustrated by Fig. 5, the control valves are included at the base of each hot water return riser. To facilitate a more accurate means of balancing the water distribution system, the hot water main has been divided into two sections. By dividing the return main in this manner, a more precise adjustment can be made with the balancing valves contained in each of the sections. Moreover, the direction of water flow in both return mains is to the center of the main as shown. From this point, the return main is extended back to mix with the cold water entering the storage generator.

To provide an even greater assurance in balancing the system, section control valves are placed on the return main as noted. With the proper adjustment of these valves it is possible to equalize the circulation in the two sections containing return risers.

Taller Buildings

The same sort of reasoning is given to taller buildings in which an upfeed system of piping is utilized. The system shown in Fig. 6, will supply water to seven stories

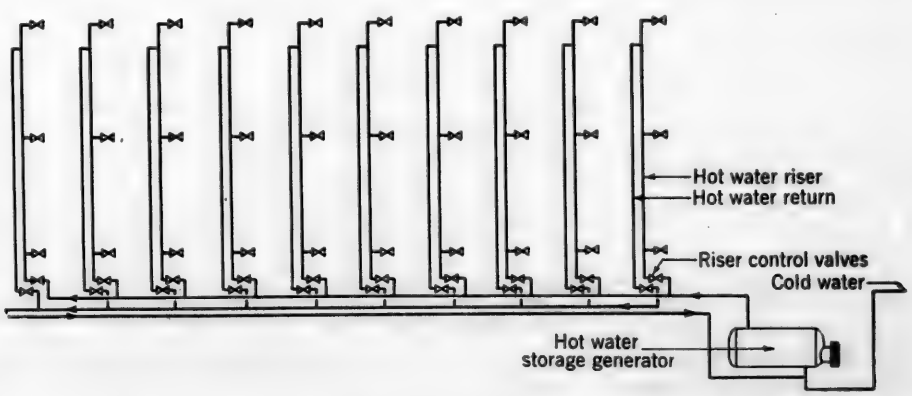


Fig. 4. Typical upfeed service hot water system with a reverse hot water return main.

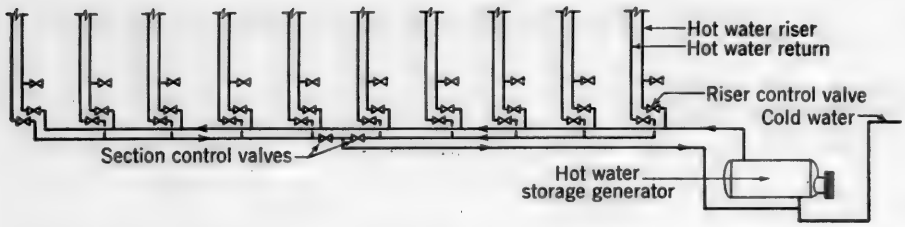


Fig. 5. Upfeed service hot water system with a divided hot water return main.

of fixtures. This number of stories has been used for example only. A taller building could be served with an upfeed system depending upon the pressure in the street main. Also for example and clarity, the distribution system has been divided into two sections with an even number of risers in each section.

Controls for Taller Buildings

Here again, the path of least resistance for the water will be through the first riser and return on either side of the hot water storage tank. It follows then, that the resistance will increase progressively in the risers toward the end of each section. It is therefore recommended that balancing valves be placed at the base of hot water return riser. With this provision, it is possible to balance the circulation of hot water in each section. In addition, section control valves are placed on the return mains as indicated. These valves enable one to balance both sections of the distribution system. Thus, regardless of the size or scope of the upfeed system of piping, when sufficient attention is given to the matter of controls, a perfectly balanced system of hot water circulation will result.

Very Tall Buildings

Very tall buildings will be regarded here as buildings that cannot be supplied with an upfeed system of piping but instead, depend upon other methods for furnishing water to the upper floors. Figure 7 is typical of the type system frequently used for such buildings.

Cold water, by means of house pumps is lifted to the roof tank. The piping for the pumps has been omitted from the drawing. The roof tank, by virtue of its height, provides the pressure needed for the hot water to adequately serve all the fixtures in the building. As shown in Fig. 7, a cold water line extends directly downward from the roof tank to the hot water storage generator. The hot water from the storage generator is elevated to the ceiling of the highest floor in the building, where it is distributed to supply each downfeed hot water riser. After the lowest fixture branches are taken off, the risers then continue on to connect with the return mains in the basement. The return mains conduct the water back to the storage generator.

Even in tall buildings, the first downfeed risers on either side of the storage generator offer the path of least resistance for the circulation of hot water. Balancing valves are placed at the base of the return risers to offer the flexibility needed to equalize the hot water circulation in each section of risers. Moreover, section control valves are placed on the return mains to have the sections operate equally.

An air relief vent has been included on the high point of the hot water line as shown. Air pockets present considerable resistance to the circulation of water, therefore, devices that will release such air pockets are generally placed at those locations in the system where the air is most likely to accumulate.

Large Scale Projects

For buildings that cover several acres of ground, the need for balancing the service hot water system becomes a problem of major consideration. In such buildings, the piping runs are very long and unless adequate attention is given the initial design, it is rather easy to end up with a section of the building that does not receive its supply of hot water. For example, we have selected a typical system, Fig. 8, which shows the general shape of the building as well as the arrangement of piping that might be installed to service all areas of the building with hot water. The

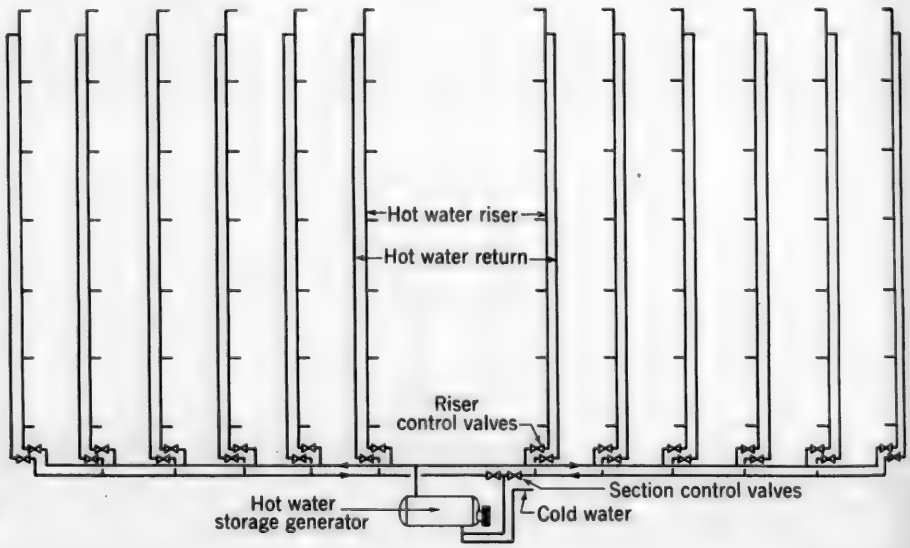


Fig. 6. Sectionalized upfeed service hot water system.

building shown could be a school, hospital, research laboratory or similar types of structures.

For buildings with extensive runs of piping, there are a number of factors that would cause sections of the system to be bypassed and not receive sufficient quantities of hot water. Water circulation can be retarded by air pockets, improper slope, traps created by offsets in piping, as well as other minor reasons.

The major problem is to design the piping in such a manner that complete control is possible in all sections of the system, thus the entire system will be a balanced one. Referring to Fig. 8, the various sections of piping are designated by Section *A*, *B* and up to Section *F*. Balancing valves are placed at the base of each return riser. Section control valves are placed on each return main. By these means, each section of piping can be adjusted to favor one or retard the other, that hot water in abundant quantities may reach all the fixtures in the building.

Check Valves

Check valves have an important role in water distribution systems because they permit the water to flow in one direction but prevent its backflow. Care should be exercised to avoid misplacement of the check valves, thereby removing any possibility of impeding circulation. Check valves with sticky or misaligned flappers can also be troublesome and retard circulation. It is a good policy to specify only quality materials for the controls so vital to a properly balanced hot water distribution system.

Pumping

Pumps with a greater capacity than the average circulation pump are sometimes used to move the water through the system a little faster. It must be remembered however, that such pumps, although they are beneficial to the system will not assure positive circulation through all the risers. Good circulation can be accomplished only by the careful placement of balancing valves as suggested.

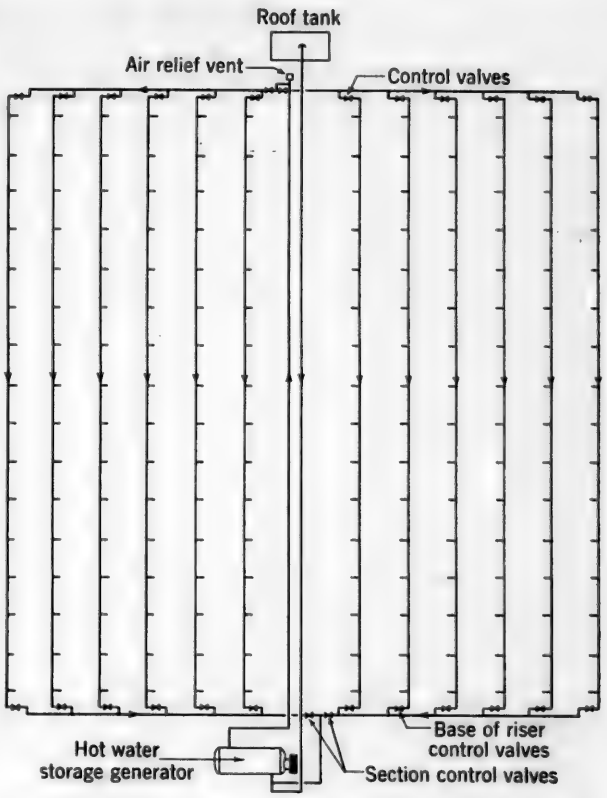


Fig. 7. Typical downfeed service hot water system.

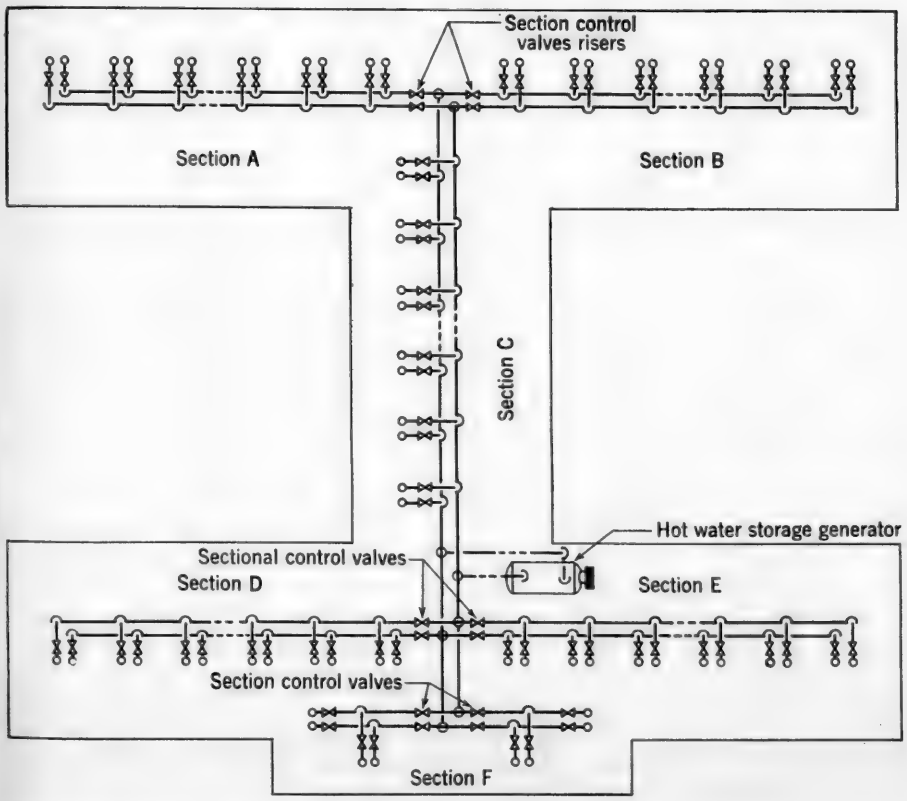


Fig. 8. Plan of lower level in a building, showing the general arrangement of hot water and hot water circulation distribution system.

DEGREE-DAYS FOR JANUARY, 1957

(A) Airport readings; (C) City office readings; (O) Readings at a point on outskirts of city

AIR CONDITIONING, HEATING AND VENTILATING'S 29th Year of Publication of Monthly Degree-Day Data

City	January			Season to January 31, incl.*		
	1957	1956	Normal	1956-57	1955-56	Normal
Abilene, Texas (A)	647	668	673	1558	1694	1771
Albany, New York (A)	1511	1279	1318	4052	4038	3877
Albuquerque, New Mexico (A)	771	736	970	2561	2228	2727
Alpena, Michigan (C)	1490	1330	1358	4276	4222	4185
Anaconda, Montana (C)	(a)	1245	1321**	(a)	4708	4492**
Asheville, North Carolina (C)	774	937	794	2120	2670	2427
Atlanta, Georgia (A)	585	724	632	1399	1959	1757
Atlantic City, New Jersey (C)	1019	978	829	2404	2709	2502
Augusta, Georgia (A)	492	682	521	1214	1827	1356
Baltimore, Maryland (C)	983	903	880	2207	2652	2417
Billings, Montana (A)	1663	1331	1305	4098	4467	4044
Binghamton, New York (C)	1355	1234	1218	3579	3791	3635
Birmingham, Alabama (A)	530	719	623	1352	1961	1751
Bismarck, North Dakota (A)	1958	1867	1730	5131	5934	5188
Block Island, Rhode Island (A)	1131	1015	1026	2905	3094	2962
Boise, Idaho (A)	1343	970	1169	3833	3312	3509
Boston, Massachusetts (A)	1284	1057	1113	3241	3315	3121
Bozeman, Montana (C)	(a)	1360	1403**	(a)	4798	4689**
Buffalo, New York (A)	1370	1243	1225	3513	3734	3649
Burlington, Iowa (A)	1462	1297	1271	3501	3832	3605
Burlington, Vermont (A)	1649	1400	1460	4430	4438	4319
Butte, Montana (C)	(a)	1364	1309**	(a)	5005	4492**
Cairo, Illinois (C)	985	942	856	2155	2549	2321
Charleston, South Carolina (C)	414	557	445	874	1332	1103
Charlotte, North Carolina (A)	643	737	704	1590	2083	1978
Chattanooga, Tennessee (A)	688	828	725	1729	2339	2105
Cheyenne, Wyoming (A)	1365	1112	1225	3929	3879	4065
Chicago, Illinois (C)[b]	1370	1085	1190**	3192	3335	3362**
Cincinnati, Ohio (C)	1048	1002	942	2351	2781	2653
Cleveland, Ohio (A)	1295	1151	1132	3145	3435	3303
Columbia, Missouri (A)	1222	1121	1091	2662	3163	3058
Columbia, South Carolina (A)	531	683	538	1254	1842	1446
Columbus, Ohio (C)	1181	1123	1051	2794	3249	3046
Concord, New Hampshire (A)	1592	1216	1392	4416	4231	4231
Concordia, Kansas (C)	1347	1238	1144	3095	3509	3192
Dallas, Texas (A)	651	615	607	1453	1566	1477
Dayton, Ohio (A)	1267	1193	1094	3031	3432	3216
Deer Lodge, Montana (C)	(a)	1336	1376**	(a)	4933	4894**
Denver, Colorado (A)	1206	955	1125	3281	3185	3473
Des Moines, Iowa (A)	1518	1392	1330	3701	4160	3785
Detroit, Michigan (A)	1355	1190	1203	3412	3550	3528
Devils Lake, North Dakota (C)	1991	1936	1866	5600	6327	5661
Dodge City, Kansas (A)	1229	1033	1076	2930	3050	3027
Dubuque, Iowa (A)	1626	1404	1414	4134	4371	4179
Duluth, Minnesota (C)	1954	1591	1696	5477	5471	5229
Elkins, West Virginia (A)	1113	1211	1017	3055	3661	3272
El Paso, Texas (A)	478	468	670	1661	1296	1756
Ely, Nevada (A)	1411	1019	1302	4349	3939	4166
Escanaba, Michigan (C)	1623	1373	1473	4558	4437	4529
Evansville, Indiana (A)	1085	1040	939	2572	2959	2654
Fargo, North Dakota (A)	1935	1826	1795	5150	5812	5333
Fort Smith, Arkansas (A)	818	843	775	1958	2259	2048
Fort Wayne, Indiana (A)	1402	1226	1200	3439	3670	3565
Fort Worth, Texas (A)	659	625	622	1522	1589	1512
Fresno, California (A)	692	517	629	1801	1452	1640
Galveston, Texas (C)	206	291	356	507	689	758
Grand Junction, Colorado (A)	1236	870	1271	3674	2970	3564
Grand Rapids, Michigan (A)	1393	1255	1287	3652	3845	3879
Green Bay, Wisconsin (A)	1718	1456	1546	4630	4633	4551
Greensboro, North Carolina (A)	796	880	806	2087	2550	2319
Greenville, South Carolina (A)	657	739	673	1643	2084	1873
Harrisburg, Pennsylvania (A)	1139	1015	1051	2973	3181	3022
Hartford, Connecticut (A)	1360	1133	1178	3719	3583	3444
Hatteras, North Carolina (C)	609	777	527	1141	1758	1315
Havre, Montana (C)	1924	1681	1513	4775	5650	4753
Helena, Montana (A)	1962	1495	1469	4798	5139	4716
Houston, Texas (C)	254	320	378	617	782	843
Huron, South Dakota (A)	1766	1732	1597	4497	5344	4600
Indianapolis, Indiana (A)	1280	1164	1122	3046	3454	3263
Jackson, Mississippi (A)	491	635	535	1196	1672	1417
Kansas City, Missouri (A)	1215	1143	1085	2783	3103	2960
Knoxville, Tennessee (A)	728	890	760	1773	2484	2214
La Crosse, Wisconsin (A)	1630	1527	1528	4216	4643	4428
Lander, Wyoming (A)	1553	1327	1494	4442	4461	4803

(a) Data not available. [b] Grant Park weather station.

* Heating season cumulative, from Sept. 1.

** Same normal figures as previously listed by HEATING AND VENTILATING since new figures are not available. All other normal figures in this table are based on a 30-year period covering 1921 to 1950, inclusive, recently compiled and published by the U. S. Weather Bureau.

Figures in this table, with eight exceptions, based on local weather bureau reports. Exceptions are Utica and Lewiston, figures for which are furnished through the courtesy of Coke Sales Department, Central New York Power Corp., Utica, N. Y., and Norman E. Ross, Bursar, Bates College, Lewiston, Me., respectively; Anaconda, Bozeman, Butte, Deer Lodge and Livingston, Mont., through the courtesy of the Montana Power Company. Tacoma figures through the courtesy of the Tacoma News Tribune.

Degree-Days for January, 1957 (Concluded)

(A) Airport readings; (C) City office readings; (O) Readings at a point on outskirts of city

AIR CONDITIONING, HEATING AND VENTILATING'S 29th Year of Publication of Monthly Degree-Day Data

City	January			Season to January 31, incl.*		
	1957	1956	Normal	1956-57	1955-56	Normal
Lewiston, Maine (O)	1567	1144	1452	4379	4006	4289
Lincoln, Nebraska (C)	1397	1303	1240	3252	3783	3483
Little Rock, Arkansas (A)	773	769	719	1731	2047	1898
Livingston, Montana (C)	(a)	1189	1220**	(a)	4254	3951**
Los Angeles, California (C)	328	271	328	539	758	779
Louisville, Kentucky (A)	1016	999	933	2458	2805	2666
Lynchburg, Virginia (A)	912	883	846	2322	2692	2471
Macon, Georgia (A)	454	598	497	1104	1598	1321
Madison, Wisconsin (A)	1605	1345	1417	4109	4224	4124
Marquette, Michigan (C)	1607	1300	1435	4507	4443	4446
Memphis, Tennessee (A)	788	806	725	1757	2146	1973
Meridian, Mississippi (A)	463	647	561	1187	1723	1517
Milwaukee, Wisconsin (A)	1544	1234	1336	3998	3958	3947
Minneapolis, Minnesota (A)	1698	1615	1562	4358	4978	4552
Moline, Illinois (A)	1492	1305	1296	3688	3905	3722
Montgomery, Alabama (A)	428	623	517	1100	1622	1381
Nashville, Tennessee (A)	845	895	778	1890	2468	2150
New Haven, Connecticut (A)	1252	1073	1113	3291	3328	3258
New Orleans, Louisiana (C)	211	391	341	520	895	770
New York, New York (C)	1104	995	995	2699	2903	2766
Newark, New Jersey (A)	1140	1013	1039	2833	3002	2951
Norfolk, Virginia (A)	778	854	729	1680	2224	1986
North Platte, Nebraska (A)	1512	1288	1271	3867	4294	3835
Oak Ridge, Tennessee (C)	723	923	834	1732	2628	2421
Oakland, California (A)	611	485	552	1731	1551	1629
Oklahoma City, Oklahoma (A)	978	878	843	2294	2478	2210
Omaha, Nebraska (A)	1463	1354	1302	3458	3972	3670
Parkersburg, West Virginia (C)	1093	1072	949	2601	3013	2773
Peoria, Illinois (A)	1424	1208	1240	3400	3647	3552
Philadelphia, Pennsylvania (C)	1025	954	933	2430	2687	2557
Phoenix, Arizona (A)	334	271	425	951	730	980
Pittsburgh, Pennsylvania (C)	1124	1050	992	2712	3061	2882
Pittsfield, Massachusetts (A)	1521	1330	1358	4246	4363	4203
Pocatello, Idaho (A)	1518	1120	1333	4388	3798	4060
Portland, Maine (A)	1580	1161	1373	4368	4217	4149
Portland, Oregon (C)	1002	693	791	2692	2466	2391
Providence, Rhode Island (A)	1303	1066	1125	3406	3438	3320
Pueblo, Colorado (A)	1131	1088	1104	3153	3118	3383
Raleigh, North Carolina (A)	748	802	691	1852	2348	1857
Rapid City, South Dakota (A)	1678	1294	1361	4199	4427	4163
Reading, Pennsylvania (C)	1113	995	1017	2828	3013	2883
Red Bluff, California (A)	687	552	617	1641	1516	1559
Reno, Nevada (A)	1213	953	1048	3758	3256	3386
Richmond, Virginia (A)	916	896	828	2149	2574	2360
Rochester, New York (A)	1408	1296	1249	3697	3884	3722
Roswell, New Mexico (A)	720	703	787	2145	2029	2202
Sacramento, California (C)	652	512	614	1650	1380	1594
St. Joseph, Missouri (A)	1328	1241	1017	3147	3550	2826
St. Louis, Missouri (C)	1175	1060	983	2599	2873	2686
Salt Lake City, Utah (A)	1203	908	1194	3652	3133	3473
San Antonio, Texas (A)	370	411	462	874	1020	1062
San Diego, California (A)	259	290	317	527	735	795
Sandusky, Ohio (C)	1314	1186	1122	3156	3413	3238
San Francisco, California (C)	494	405	462	1298	1397	1343
Sault Ste. Marie, Michigan (A)	1748	1498	1587	5004	4876	4927
Savannah, Georgia (A)	391	568	424	953	1445	1099
Scranton, Pennsylvania (A)	1337	1222	1141	3651	3785	3395
Seattle, Washington (C)	891	714	753	2653	2689	2435
Sheridan, Wyoming (A)	1705	1352	1392	4335	4611	4437
Shreveport, Louisiana (A)	548	569	550	1249	1492	1398
Sioux City, Iowa (A)	1593	1489	1423	3893	4448	4131
Spokane, Washington (A)	1547	1114	1243	4286	4181	3348
Springfield, Illinois (A)	1324	1204	1116	3148	3476	3114
Springfield, Missouri (A)	1109	1071	1001	2628	2977	2834
Syracuse, New York (A)	1428	1307	1225	3715	3912	3565
Tacoma, Washington (C)	(a)	724	797	(a)	2724	2647
Toledo, Ohio (A)	1385	1266	1197	3499	3837	3561
Topeka, Kansas (C)	1246	1191	1088	2869	3265	2979
Trenton, New Jersey (C)	1115	1014	1004	2771	3001	2856
Tulsa, Oklahoma (A)	957	904	856	2196	2409	2238
Utica, New York (O)	1343	1349	1248**	4194	4069	3785**
Valentine, Nebraska (A)	1673	1405	1361	4171	4611	4070
Walla Walla, Washington (C)	1371	931	1023	3420	3215	2989
Washington, D. C. (C)	985	926	884	2336	2632	2488
Wichita, Kansas (A)	1190	1094	1023	2767	3007	2786
Williston, North Dakota (C)	1963	1800	1705	5146	5872	5200
Winnemucca, Nevada (A)	1336	934	1153	4105	3570	3748
Yakima, Washington (A)	1515	1161	1181	4091	4097	3650

For footnotes, see page 94.

PRODUCT APPLICATIONS

New, Unusual, or Ingenious Uses of Equipment and Materials

Solar Building's Evaporative Cooler Doubles as Tower for Heat Pump

In summer, the primary cooling source for the Solar Building, Albuquerque, N. Mex., is an evaporative cooler, a product of Marlo Coil Co., St. Louis, Mo., which provides chilled water for the comfort conditioning system. During periods of unusually high heat loads, the cooling function is supplemented by a heat pump, with the evaporative cooler acting as a cooling tower.

Radiation from the sun is the primary source of heat in winter. One entire wall (illustrated in part) of the building acts as a collector surface, which absorbs heat from the sun and transfers it to water circulating through channels in the collector plates. The warm water is carried to the interior areas for heating, or stored for use during the night or on cloudy days. The heat pump is used as an auxiliary heat supply in winter when solar radiation is insufficient.

Since collector efficiency increases as circulating water temperature decreases, floor and ceiling radiant panels utilize lowest possible temperature water.

Among the occupants of the building are its owners and designers, the mechanical engineering firm of Bridgers and Paxton. Architects were Stanley and Wright; Paul Priest, general contractor.

Puddles on the Mill Floor Avoided by Glass Blocks

Replacement of moisture-rotted wood sash and their conventional flat glass window lights with glass blocks five years ago solved a troublesome and damaging condensation and window maintenance problem at the Poinsett textile plant of Abney Mills, Greenville, S. C.

Mortared into place to become an integral part of the mill wall, the glass blocks offered an insulating value almost equivalent to that of the wall itself. As a result, according to company officials, moisture which had previously formed on the flat glass windows, rotting the sash, has been practically eliminated. Light directing blocks, produced by Pittsburgh Corning Corporation were used in the installation.

Previously, the company said, condensation was so severe at times that puddles would form on the floor to create a footing hazard. Excess moisture, almost a mist, was not overcome by the air-conditioning apparatus.

In addition to correcting these problems, the 8 by 8-in. glass blocks also made possible a 50% reduction in boiler requirements. Where two boilers were required to maintain the desired 80 deg F in the mill, only one is now operated. This unit is operated only on Monday mornings following the Sunday shut down. As soon as the mill temperature reaches the desired 80-deg level, the heat is shut off; heat energy from the machines maintaining the desired temperature.

Window breakage, a frequent occurrence with flat glass, has been practically eliminated and window washing is now done with a spray hose.

Internal Corrosion of Pipe and Tubing Checked by Neoprene End Caps

Pipe and tubing may be subject to costly internal corrosion during storage. In addition, pipe threads become cluttered with sand and grit; pipe dope dries and hardens.

One solution consists of applying re-usable duPont neoprene caps to pipe ends. By adding a small amount of dehydrating agent before slipping on the easily-fitted caps, the inside of expensive alloy tube stock is protected from corrosion.

Protokap, Inc., Houston, Tex., manufactures two types: a lightweight roll-on cap for 2 to 10-in. dia pipe, and a heavier slip-on cap for 2 to 20-in. dia.

TUBING HANGERS. Now available from the manufacturer is one complete line comprising every standard type of hanger and support for copper tubing. Catalog is available.
Inside front cover — Item 117

FAN UNITS. No guess work is involved in selection of these fan units because cfm ratings are certified and backed by accurate wind tunnel tests. Bulletin is available.
Page 1 — Item 118

BASEBOARD RADIATION. For steam or hot water heating these graceful yet rugged enclosures with efficient finned tube heating elements are available in a wide variety of standard or custom designs. Bulletin is available.
Page 2 — Item 119

LIQUID CHILLER. Manufacturer's liquid chiller uses piped-in brine for a compact, efficient, low-cost air conditioning system. Catalog is available.
Page 4 — Item 120

WROUGHT IRON PIPE. Standing guard against corrosion, wrought iron chilled water lines assure uninterrupted cooling facilities for Continental National Bank in Houston, Texas. Booklet is available.
Page 9 — Item 121

DIAPHRAM TYPE FLUSH VALVES. Largest and most powerful vessel ever built, the U. S. S. Saratoga, is outfitted with nearly 500 diaphragm type flush valves, designed for the rigors of salt water flushing. Handbook is available.
Page 11 — Item 122

COIL SECTIONS. Completely drainable and easily cleaned these coil sections are specially designed for installations where frequent mechanical cleaning of the inside of the tubes is required. They feature high heat transfer rate. Bulletin is available.
Page 13 — Item 123

THERMOSTATIC CONTROL SYSTEM. Abington, Pa., has a new $6-million high school which has heating and ventilating functions regulated by the manufacturer's thermostatic control system. Information is available.
Pages 14-15 — Item 124

BACKWARD CURVE BLOWERS. Company controls entire production of these versatile blowers from drawing board to finished product. It is guaranteed unconditionally for quiet, trouble-free operation. Bulletins are available.
Page 16 — Item 125

MODERN COAL BURNING. Many industries such as Funk Bros. Seed Co., Bloomington, Ill., are burning coal the modern way with resulting increased steam capacity, higher quality steam, and cleaner plant operating conditions. Further information and additional case histories are available.
Page 17 — Item 126

Circle numbers corresponding to the items and advertisements in which you are interested. Print your name and address clearly. Information will be sent directly from manufacturers.

Below and on the following pages are given brief digests of the advertisements appearing in this month's issue. Use this Digest to locate and refer to the advertisements in which you are particularly interested, then fill out and mail the prepaid postcard to request further information from manufacturers.

The items appear in the same order as the advertisements to which they refer, to facilitate obtaining further information after reading an advertisement. NOTE: All advertisements are digested here except those received too late for inclusion. The Index of Advertisers lists all the advertisements in this issue.

Use the postcard below for catalogs, new equipment and materials, as well as Ad-Digest items.

ELECTRONIC CONTROLS. Company praises flexibility of electronic control systems. Because control point and throttling range are unlimited, controls are highly adaptable to any building control application. Information is available.
Pages 18-19 — Item 127

ELECTRONIC AIR CLEANER. Installation of company's electronic air cleaner assures freedom from the costly scourge of airborne dirt. Information is available.
Pages 20-21 — Item 128

DRIP-PROOF MOTORS. Manufacturer's drip-proof motors have been tested in tough air conditioning jobs and proved outstanding for rugged performance, dependability, and quiet operation. Information is available.
Pages 22-23 — Item 129

STEEL PIPE. The company's distributing system for steel pipe is set up to provide immediate delivery from large, complete stocks, a single source of supply, and 24-hour service. Information is available.
Page 24 — Item 130

REFRIGERANTS. Super-dry refrigerants assure top performance. They are indexed by name, number, and color. Information is available.
Page 25 — Item 131

CLEAN AIR. Instead of selling merely one or two kinds of filters the company sells clean air and manufactures more than a dozen different types of filters to achieve it. Information is available.
Pages 26-27 — Item 132

COOLING TOWERS. Company is proud of their record of being No. 1 on contractors' Hit Parade in the packaged cooling tower field. Information is available.
Pages 28-29 — Item 133

PNEUMATIC CONTROLS. Pneumatic control flexibility solves the most intricate problems as easily as the simplest. Pneumatic control can be applied to all types of air conditioning and to all makes of equipment. Information is available.
Pages 30-31 — Item 134

DUAL FUEL BURNER. Intensive research by company engineers has resulted in the development of the first dual fuel burner specifically designed for use in a direct fired space heater. It burns light oil, heavy oil, or gas with equal efficiency. Bulletin is available.
Pages 32-33 — Item 135

INQUIRY CARD

Circle below item numbers on which you wish catalogs or further information.

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This service available only to U.S. and Canadian readers.

Name .....

Firm .....

Nature of Firm's Business .....

Street .....

City .....**Zone** ....**State** .....

This card is void after June 1, 1957

Ad-Digest

COIL UNITS. Company's coil units of copper construction were chosen for the air conditioning system of the Dime Savings Bank of Brooklyn. Copper coils plus plastic spray piping and nozzles stand up to severe corrosive action produced by water in so many regions. Catalog is available.
Page 34 Item 136

REFRIGERATION AND AIR CONDITIONING EQUIPMENT. The manufacturer's refrigeration and air conditioning equipment is readily and dependably available from a coast to coast network of supply depots. Information is available.
Page 35 Item 137

GLASS FIBER INSULATION. Glass fiber insulation is made by this company to meet the insulating requirements of manufacturers and installers of furnaces, air conditioners, and related duct work. The flexible insulation is held to panels by an adhesive. Bulletins are available.
Page 36 Item 138

AIR DISTRIBUTION. The company offers its library of engineering data which include catalogs on diffusers, air filters, and high pressure terminals.
Page 37 Item 139

AIR CONDITIONING AND HEATING LINE. Relaxed returnee from ASHAE Show is sold on one source-one responsibility feature of manufacturer's complete air conditioning and heating line exhibited. Information is available.
Page 38 Item 140

DIRECT-DRIVEN PUMP. One of the big reasons why the manufacturer's direct-driven pump is specified as an integral part of so many air conditioning systems is its compact, rugged design and trouble free operation. Information is available.
Page 39 Item 141

CENTRIFUGAL REFRIGERATING MACHINES. Multi-million dollar school-plant expansion program in Dallas, Texas utilizes manufacturer's centrifugal refrigeration machine which supplies chilled water to various air conditioning units. Information is available.
Page 40 Item 142

METAL FABRICATION. This company combines vast experience in metal fabrication with a complete range of special linings for low cost long-lived tanks and receptacles. Information is available.
Page 41 Item 143

MOTOR SERVICE. Catastrophic or routine service on motors or generators is offered by this manufacturer from its more than 100 certified service shops. The shops have the manpower and equipment to perform repairs on any motor or generator of any make. The shops' locations in different areas are available.
Page 42 Item 144

PACKAGED LIQUID CHILLERS. These packaged liquid chillers are available up to 50 tons. All controls are in single panel box for easier access and greater protection. Information is available.
Page 43 Item 145

BRONZE VALVES. This company makes a bronze valve in gate, globe, angle, or check styles for every type of service. Designed to reduce wire-drawing, valves enjoy long lives. Information is available.
Pages 44-45 Item 146

REFRIGERATION MOTOR CONTROLS. Manufacturer's refrigeration motor controls are popular for air conditioning and refrigeration service because they are designed to be trouble free and dependable. Information is available.
Page 46 Item 147

CENTRIFUGAL FANS. Portable, self-contained units for process and ventilating applications are made in four types and 12 basic sizes with capacities from 160 to 19,070 cfm. Bulletin is available.
Page 47 Item 148

DUAL DUCT AIR CONDITIONER. Manufacturer's dual duct air conditioner system consisting of all air, high velocity units has new automatic controls and deliver constant volume conditioned air. Selection manual is available.
Page 48 Item 149

POWER ROOF VENTILATORS. For exhausting or ventilating large areas where duct work may not be desirable, these power roof ventilators are easy to install and offer rugged, maintenance free operation. Bulletin is available.
Page 49 Item 150

SEAMLESS PIPE. Approximately 470 tons of the manufacturer's seamless pipe were used in the air conditioning and heating systems of the Socony Mobil Building in New York. In addition 350 tons were used in plumbing system. Information is available.
Page 50 Item 151

HEATING PUMPS. Five types of heating pumps are illustrated. They all feature quiet operation, low inlet connections, and accessibility for inspection. A pump is available for each and every heating requirement. Bulletins available.
Page 51 Item 152

ROOF AND WALL EXHAUSTERS. These roof and wall exhausters are preproved under simulated field conditions in the factory. In addition, units must pass rigid inspections for long-lived operation. Information is available.
Page 52 Item 153

HEAVY FUEL OIL BURNER: The basic engineering advances used in these oil burners is a new atomizer method. The two-stage atomizing principle reduces heavy oil to a microscopic mist. Information is available.
Page 53 Item 154

UNDERGROUND PIPE PROTECTION. The manufacturer's insulation provides complete three-way protection for hot underground pipes. Material is readily adaptable to future pipe changes. Brochure and installation procedures are available.
Page 54 Item 155

STEAM HEATING CONTROLS. Sixteen of the manufacturer's weather compensated steam heating controls serve Beardsley Terrace housing project at Bridgeport, Conn. Mechanical engineer for installation endorses performance of these controls. Information is available.
Page 55 Item 156

COPPER WATER TUBE. Copper water tube for refrigeration and air conditioning lines can be worked in tight corners because the solder or brazed joints need no wrench room and rust cannot clog the lines. A technical advisory service is available for assistance with problems.
Page 111 Item 157

CONTINUOUS DIFFUSING GRILLE. To prevent cold air currents that flow down large glass areas and spill into the room, this continuous line diffusing grille is recommended. Grille performance is guaranteed when applied according to published data. Data are availble.
Page 113 Item 158

AIR CONDITIONER EQUIPMENT. For new hospitals or existing hotels, manufacturer's air conditioners are the quiet, fingertip-controlled answer to year-round comfort. No duct work is required. Bulletin is available.
Page 115 Item 159

FINNED COILS. Manufacturer's finned surface increases air turbulence between

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BUSINESS REPLY CARD

FIRST CLASS PERMIT NO. 53, SEC. 34.9, P. L. & R., NEW YORK, N. Y.

AIR CONDITIONING, HEATING AND VENTILATING

93 WORTH STREET

NEW YORK 13, N. Y.

AD-DIGEST SERVICE

Ad-Digest

fins for better air to surface contact. Heat transfer is markedly increased. Bulletins are available.
Page 119 Item 160

EXPANSION JOINTS. Manufacturer's expansion joints feature repacking under full steam pressure, low maintenance costs, long service life, and need of fewer joints per length of pipe line. Bulletin may be obtained.
Page 121 Item 161

THERMODYNAMIC STEAM TRAP. Manufacturer's thermodynamic steam trap, in sizes ⅜ to 1 in., have bodies as small as the corresponding tee fitting. Capacity is determined, not by a bulky body, but by the effective orifice and operating conditions. Information is available.
Page 123 Item 162

DUCT FANS. Installed at the Columbus, Ohio, plant of North American Aviation, Inc., these duct fans are used to efficiently exhaust acrid fumes and steam vapors from a spray type processing machine. Bulletin is available.
Page 125 Item 163

INDUSTRIAL FANS AND VENTILATING SETS. These readily available industrial fans meet all fume and dust removal requirements. Available in steel or cast iron casings, direct or V-belt driven models. Information is available.
Page 127 Item 164

INTEGRAL-FURNACE BOILERS. Two of the company's integral-furnace boilers are providing dependable steam for the presses at Dunlop Tire & Rubber Co.'s Buffalo Plant. Information is available.
Page 129 Item 165

ONE-PIECE PIPE INSULATION. Manufacturer's one-piece pipe insulation, which snaps around piping, is a natural for high velocity ducts for air conditioning. Information is available.
Pages 130-131 Item 166

CAST IRON PIPE FITTINGS. It pays to standardize on precision built cast iron pipe fittings. Accurately machined with clean, sharp threads and chamfered entrances, manufacturer's screwed fittings are made to save time on every job. Condensed catalog is available.
Page 132 Item 167

INCREMENT START MOTORS. These motors start easily and quickly with a minimum of line voltage disturbance because they are designed for increment starting and are furnished with increment-type starters. Bulletins are available.
Page 133 Item 168

BASEBOARD RADIATION. Manufacturer's baseboard radiation features strength and appearance and is suitable for both hot water and steam systems. Versatility is provided by full line of optional equipment. Information is available.
Page 135 Item 169

FUEL OIL HEATER. This fuel oil heater consists of oil in the shell, and water in the tubes, separated by a special factory-filled heat transfer liquid. Bulletin is available.
Page 136 Item 170

Circle numbers corresponding to the items and advertisements in which you are interested, print your name and address clearly. Information will be sent directly from manufacturers.

OIL-FIRED BOILER. Called the "easier" boiler, this oil-fired unit was designed for ease of erection, insulation, and capacity enlargement. Bulletin is available.
Page 137 Item 171

INDUSTRIAL HEATERS. Portrayed in story form are industrial unit heaters available from the manufacturer's especially the one and one-half million Btu per hour model called the Giant. Publication is available.
Page 138 Item 172

PLUMBING SHOCK ABSORBERS. Manufacturer's plumbing shock absorbers eliminate noise, distraction, water hammer. Adaptable to new and old piping systems. Manual is available.
Page 139 Item 173

DUAL FUEL BURNERS. In situations where advantage can be taken of off-peak gas rates it is often possible to reduce heating costs substantially with dual fuel burners, especially designed for such circumstances. Catalog is available.
Page 140 Item 174

AIR CONDITIONING SYSTEM. Manufacturers zone-by-zone method, consisting of ceiling and floor-mounted units, was selected for the world's first fully air conditioned men's clothing plant, H. Daroff & Sons, Philadelphia, Pa. Information is available.
Page 141 Item 175

MERCURY SWITCHES. Company's weather resistant mercury switches have calibrated dial, operating point indicators and hermetically sealed contacts for pressure or temperature regulation. Catalog is available.
Page 142 Item 176

VIBRATION CONTROL. The manufacturer's complete line of products provides an answer to any installation, vibration, and noise problem. Bulletin is available.
Page 142 Item 177

AIR COOLED CONDENSERS. As engineers plan larger tonnage installations, more of this company's remote type air cooled condensers that require no water are sold. They can be used with any size compressor regardless of horsepower. Requires less horsepower, less piping and is easier to install. Bulletin available.
Page 143 Item 178

HERMETIC COMPRESSORS. Two new hermetic type compressors are compact, smooth operating, light, and easy to install. They give greatest performance in smallest space and more capacity per dollar. Information is available.
Page 145 Item 179

ROLL-TYPE FILTER. This roll-type, automatic filter combines fully automatic operation and high efficiency with large dirt-holding capacity and minimum maintenance. Information is available.
Page 147 Item 180

CONDENSER CLEANING SYSTEM. Manufacturer's condenser cleaning system is a time and money saver for cleaning and descaling all types of condensers including cooling towers, water heaters, as well as blower wheels. Bulletin is available.
Page 148 Item 181

HOIST ASSEMBLY. Manufacturer's hoist assembly raises 100 to 4000 lbs as high as 18 ft. Device often pays for itself on first job. Bulletin is available.
Page 148 Item 182

BLOWER UTILITY SETS. Self-contained blower utility sets, in a wide range of sizes and capacities, are used to supply or exhaust air in a wide variety of applications ranging from telephone booths to industrial plants. Information is available.
Page 149 Item 183

MOISTURE CONTENT CONTROL. This air conditioning method dries air directly by using a moisture-absorbing liquid spray. It makes humidity control a separate function from lowering or raising temperatures and saves the refrigeration used to condense moisture. Bulletins are available.
Page 150 Item 184

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Circle below item numbers on which you wish catalogs or further information.

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Name .....

Firm .....

Nature of Firm's Business .....

Street .....

City .....**Zone** ....**State** .....

This card is void after June 1, 1957

Ad-Digest

WELDED STEEL PIPE. Two new buildings, one a junior high school in California and the other a ten-story office building in South Carolina, have hundreds of feet of welded steel pipe in their plumbing and heating systems. Wide range of sizes is available. Information is offered.
Page 151 Item 185

BOILER WATER LEVEL CONTROLS. Blowing down the float chamber once a shift, and inspecting the switches once a month comprises the maintenance required to keep the company's boiler water level control in safe condition. Catalog and information is available.
Page 152 Item 186

PORTABLE PYROMETER. A wide selection of thermocouples and extension arms assures adaptation to your needs of this portable pyrometer. Eight scaled ranges are available up to 2000 deg F. Bulletin is available.
Page 154 Item 187

FLEXIBLE DUCT CONNECTORS. Flexible duct connectors are made by this company in one-piece, factory-assembled, metal-to-material units that unroll flat. A choice of canvas, asbestos, or neoprene-coated fiber glass is offered attached to galvanized steel or aluminum in 25, 50, or 100-ft rolls. Catalog and specification sheet are available.
Page 154 Item 188

AIR CONDITIONING EQUIPMENT. Eighteen pamphlets containing helpful air conditioning and refrigeration data are available from this manufacturer of heating, ventilating and air conditioning units. Items include the cooling tower, a discussion of steam, water and direct expansion, air handling, the air cooled condenser, central plant air conditioner, and ceiling-hung conditioners.
Page 156 Item 189

PUMPS. Ad describes company's pump warranty and exchange plan providing 12-month warranty, 15-min. replacement, and sliding scale exchange plan. Information is available.
Page 156 Item 190

POWER ROOF VENTILATORS. From skyscrapers to rambling one-story plants silhouettes of these ventilators enhance building appearances. Modern housing designs and efficiently engineered fans reflect well on your specifications. Information is available.
Page 157 Item 191

DIRECT FIRED HEATERS. Direct fired heaters feature quiet operation, high efficiency, low fuel costs and easy accessibility through good design. Data are available.
Page 157 Item 192

AIR DIFFUSERS. Slotted air diffusers are made of extruded aluminum in modules of 2, 3, 4, or 6 ft by this company. Square diffusers are made of pressed steel with an aluminum finish in capacities from 50 to 1250 cfm. Performance and selection data are available.
Page 158 Item 193

AIR FILTERS. The line of air filters offered by this manufacturer includes: a viscous type, permanent and cleanable for low velocity systems; one that operates at 300 to 500 fpm; and a permanent, cleanable grease filter for range canopies and kitchens. Bulletins are available.
Page 158 Item 194

ICE BANKS. Sweet water ice banks are designed by this manufacturer to deliver tons of 32 to 34-deg F ice water for recirculation through air cooling coils in air conditioning systems. Designed for use with Freon, methyl chloride, or ammonia, the banks may be added to existing systems for increased capacity. Catalog is available.
Page 159 Item 195

SCOTCH BOILERS. Scotch boilers are offered by this company for packaged heating units. The area of the boiler directly exposed to the radiant heat of combustion is a large percentage of the total heating surface. Ratings are moderate but extra loads can be handled with larger burners. Information is available.
Page 159 Item 196

UNIT COOLERS. Large capacity unit coolers are designed by this company to deliver full rated capacity in order to reduce the number of units required and eliminate extra piping and electrical connections. Units are made to operate at all normal temperatures. Information available.
Page 160 Item 197

AUTOMATIC SHUTTER. Manufacturer's automatic shutter is unusually sensitive to air current causing the aluminum louvers to open instantly when fan is turned on and snap shut when fan is turned off. Information is available.
Page 160 Item 198

WATER COOLERS. Water coolers are available in three distinctive lines and feature hand and foot controls which are mechanically operated. Bulletin is available.
Page 160 Item 199

INDICATORS AND GAUGES. Manufacturer features instruments for liquid depth measurement and remote indication of specific gravity. Two bulletins are available.
Page 161 Item 200

INDUSTRIAL VENTILATORS. For industrial venting and heating plant exhausting the manufacturer has line of 64 standard and heavy duty model blowers. Capacity ranges from 140 to 16,700 cfm with or without stacks. Engineering data-book is available.
Page 161 Item 201

REFRIGERATING EQUIPMENT. Nine of this company's compressors carry the air conditioning load, divided into three systems, for the first completely air-conditioned large hotel in the North, the Claypool at Indianapolis. Ice-making and quick freezing equipment also offered. Information available.
Page 163 Item 202

INTERIOR FIRE PROTECTION. Manufacturer's interior fire protection line more than meets specifications. It also meets the highest standards of safety plus design, practicality and economy. Bulletin is available.
Page 163 Item 203

RELIEF VALVES. The extra capacity, extra safety, and assurance of positive protection makes the manufacturer's relief valves the choice of engineers and contractors. Data sheets are available.
Inside Back Cover Item 204

BOILER HEAT. Manufacturer praises boiler heat, and believes it, as well as the entire heating industry, should be promoted in the imaginative manner with which the auto industry describes its wares. Information is available on boiler safety controls.
Back Cover Item 205

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BUSINESS REPLY CARD
FIRST CLASS PERMIT NO. 53, SEC. 34.9, P. L. & R., NEW YORK, N. Y.

AIR CONDITIONING, HEATING AND VENTILATING
93 WORTH STREET
NEW YORK 13, N. Y.

AD-DIGEST SERVICE

NEWS OF EQUIPMENT AND MATERIALS

Use the convenient prepaid postcard appearing on page 97 for securing additional information on new equipment and materials described in this department.

Units Heat, Cool, Ventilate

Herman Nelson Roll-O-Vent heating, cooling, and ventilating units, announced by American Air Filter Co., Inc., Louisville, Ky., roll away dirty filter media.

The basic unit consists of a fan section, coil section, and automatic filter. Standard and non-freeze steam coils, as well as hot and chilled water and direct expansion coils are available in a wide variety of sizes and capacities. Various accessories to adapt the unit to almost any given field conditions are available. Among these are mixing dampers, face and by-pass dampers, intake dampers and humidifiers.

Filter media is composed of continuous, slightly curled, interlaced glass filaments averaging .001-in. dia held in place at every point of contact with a thermo-setting plastic bond to form a thick resilient pad or blanket.

Fluffy blankets of the glass filaments are fabricated into 65-ft lengths, impregnated with a non-flammable gel-like viscosine that will not drip at temperatures up to 150 deg F. Cut into strips of different widths to fit line units, they are tightly rolled on spools having an outside diameter of 13 in.

Media is disposed of by merely removing the spool. There is no maintenance necessary except for the changing of the spools approximately once every year. The media mat is inexpensive, clean to handle, and will not injure the hands of maintenance personnel. Since clean media is periodically introduced, filter resistance remains constant.

More information? Circle Item 1 on postcard, page 97.

Fuel Oil Sludge Dispersant

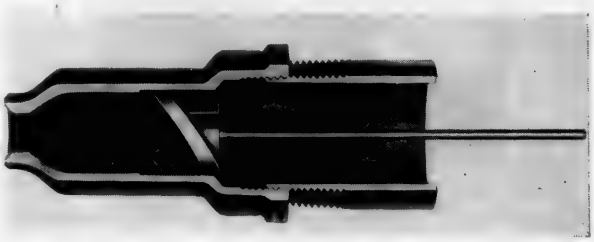
A fuel oil additive, made by E. I. du Pont de Nemours & Co., Wilmington, Dela., and used successfully for several years in home heating oils, has now been found to prevent costly operational problems of industrial heating plants using the heavier and cheaper residual oils.

The product, Fuel Oil Additive No. 2, is a sludge dispersant. It prevents sludge and gummy residue from forming in storage tanks by keeping the millions of tiny particles in the fuel from clustering together and settling to the bottom of the tank. Because the additive keeps the particles small, it prevents the clogging of filters and burner nozzles. When used in large enough quantities and recirculated through the storage tank, it cleans out sludge which may have accumulated, and continued use prevents new sludge from forming.

More information? Circle Item 2 on postcard, page 97.

Nozzle Vane Pulls Out

When spray nozzles must be mounted at hard-to-get-at places, the cleaning job is often difficult. To simplify this type of maintenance, Spraying Systems Co., Bellwood, Ill., has introduced its Fulljet nozzle with pull-out-vane.

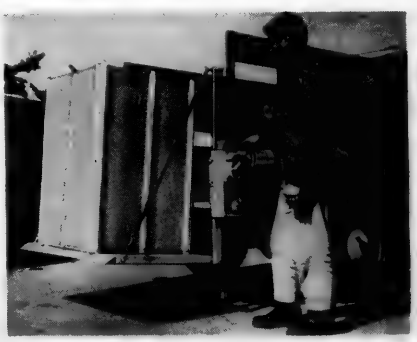


Nozzle vane is made with a small, female-threaded connection to receive a pull-out rod, to be installed by the user in whatever length required. The rod extends back inside the pipe to some connection point that is easily accessible. When cleaning is needed the vane is merely drawn back through the pipe, removed, and cleaned while the nozzle itself is flushed out.

More information? Circle Item 3 on postcard, page 97.

Electrically Powered Tailgate

Companion to the company's manually operated model, the rugged new Jiffy-Lift, electrically powered to lift up to 600 lb in 15 seconds, is available from Mid West Body & Manufacturing, Paris, Ill.



The tailgate is geared to eliminate battery drag. Heavy duty push button control has built-in lock to assure safe operation. The all steel, ramp type unit weighs 225 lb and is designed to provide better weight distribution with larger load capacity; yet it permits the vehicle to operate within its present license fee. There are no hydraulic lines, pumps, or cylinders to leak or wear out.

More information? Circle Item 4 on postcard, page 97.

Sectional Air Conditioning Unit

Flexibility and ease of installation in the field are advantages afforded by a line of packaged air conditioning units designed for commercial and industrial installations where the water supply is limited. These units, known as Model AECR, are now being marketed under the Capitolaire trade name by National-U. S. Radiator Corp., Johnstown, Pa.

Available in 12 arrangements designed to cope with any application problem, units' sectional construction permits remote location of one of the components when necessary.

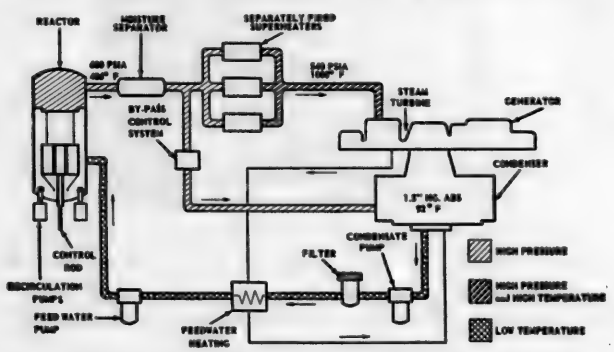
Completely packaged and self-contained, the model is available in 7½, 10, 15, 22½, 30, 40, 50 and 60-hp sizes, supplying broad diversification which will conform to all types of installations. Built-in evaporative condenser reduces water consumption as much as 95%, and can be installed either as an integral component or according to space limitations, the company states.

Accessories available for the central station air conditioners include: heating coils, flat or V-type filter sections, capacity control and unloaded starting devices.

More information? Circle Item 5 on postcard, page 97.

Atomic Boiling Reactor

An advanced type of nuclear power reactor, a controlled recirculation boiling reactor (CRBR) is announced by Industrial Press-Industries Group, Allis-Chalmers Mfg. Co., Milwaukee, Wis. A group of midwest



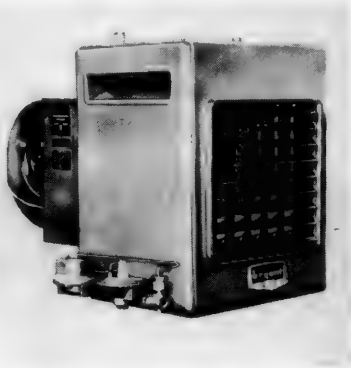
utility companies plan to construct a 60,000-kw plant of this design. It will generate the heat equivalent of 20 tons of coal per hr.

As shown in illustration, there are separately-fired superheaters. Fuel for them is conventional. Reactor vessel is 23 ft high, 9-ft dia, housed in 70-ft, 45-ft dia steel and concrete housing. Recirculation pumps shown control reactor power.

More information? Circle Item 6 on postcard, page 97.

Unit Heater Designed for Quietness

Fan equipped unit heater, Model 328, is available in three sizes from Bryant Manufacturing Co., Indianapolis, Ind. The 150,000 and 225,000 Btu per hr sizes feature a belt driven blower assembly, and the smaller 100,000



Btu per hr size has a direct drive blower assembly. To provide almost inaudible operation, all 328 blower bearings and the shaft are mounted in rubber. Design on the two larger sizes enables the installer to adjust belt tension simply by turning an externally mounted screw.

Easy ductwork connections are another feature designed into the unit. When installed without ductwork, a gold trim and louver assembly is available. The model is AGA approved for use with natural, mixed, manufactured, L-P, and for dual fuel operation on natural and L-P gases.

More information? Circle Item 7 on postcard, page 97.

Zinc-Clad Aluminum Sheets

A new product, which promises to eliminate many of the problems associated with smooth and economical soldering of heat-exchanger equipment, is announced by Aluminum Company of America, Pittsburgh, Pa. Zinc-clad aluminum alloy, long in the research and development stage, is now available for the first time in commercial quantities.

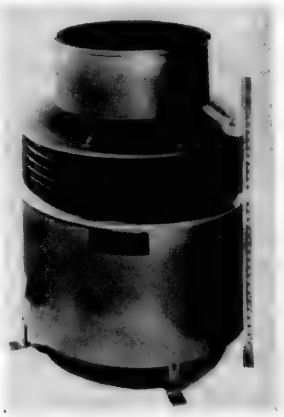
Fabricated with one or both sides clad, and in coil or flat sheet form, the product, designated Alcoa Soldering Sheet, has been hailed as bringing aluminum within range of the ease of solderability heretofore enjoyed by copper. In its emergence from the laboratory to industrial use, it is expected to help solve many joining problems and to open the door to a host of aluminum applications yet untried.

Used with the company's specially developed soldering techniques, zinc-clad aluminum will simplify normal maintenance and repair problems of soldered assemblies, in addition to reducing costs of production methods.

More information? Circle Item 8 on postcard, page 97.

Conditioner Uses Round Coil

An air-cooled air conditioner which uses a sloped circular condensing coil is introduced by F-5 Air Conditioning Corp., Tulsa, Okla. Available in 3, 5, 7½, and 10-ton units, the company says they are equally suited for residential and commercial applications.



Sloped circular condensing coil is designed to eliminate blind spots found in rectangular coils and to permit more efficient drainage of the condensing refrigerant. By eliminating blind spots, the company states, it is able to deliver 100% efficiency. In addition, circular coil permits economies in manufacture which considerably reduce its cost.

Components of each unit are: housing, air cooled condenser, compressor, receiver, fan, fan motor, and condensing unit control box.

Housing is weatherproof and is finished in gray enamel. This permits location of the unit out of doors.

The compressors are either Copeland or Tecumseh (optional) with either 230-volt, 60-cycle, single phase motors or 220-208 volt, 60-cycle, 3-phase motors.

Condenser only is offered in all sizes from 2 to 30 tons for either air conditioning or refrigeration uses.

More information? Circle Item 9 on postcard, page 97.

Heavy Fuel Oil Heating System

Use of a tank heater to keep the oil in the storage tank warm, while necessary, is not always enough to prevent No. 6 fuel oil from freezing during a prolonged burner shutdown. To assure that there will be no freezing in the pipes or clogging and gumming of the burner nozzle, York-Shipley, Inc., York, Pa., has designed a heating-circulating system especially for No. 6 oil. It does three things:

1. Keeps the oil in continuous circulation. The pump works even when burner flame has been shut off or modulated to low firing. Oil not wanted at the burner is diverted automatically to a special chamber and returned to the heated storage tank to be warmed for recirculation.

2. Compensates for variable viscosity. Regardless of the viscosity or temperature of the oil being supplied, the viscosity compensator will provide either a constant or a modulated flow of oil to the atomizing cup. The compensator houses an electric preheater to provide a final control of the oil temperature.

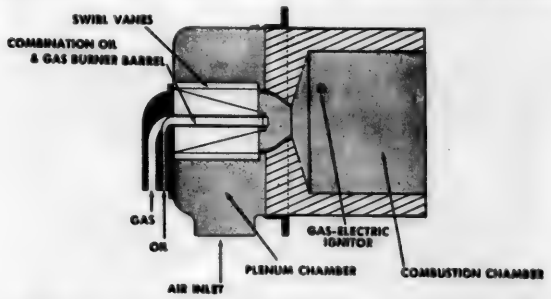
3. Heats burner nozzle. A low-voltage current is supplied to an induction coil wrapped around the burner nozzle. This keeps the oil within the nozzle from freezing after the burner has shut down in response to a drop in steam demand.

Operation of the viscosity compensator is made possible by the fact that the oil transfer pump will provide it with a constant flow of oil. The compensator contains three chambers. The oil inlet chamber receives the oil from the storage tank; the oil outlet chamber returns the unfired oil to storage; and the preheater chamber delivers oil of the proper temperature to the fuel tube.

More information? Circle Item 10 on postcard, page 97.

Vortex Burners

Series LV Vortex burners are available from Thermal Research & Engineering Corp., Conshohocken, Pa. Described as a compact, self-contained unit, it features integral construction of the burner and combustion chamber.



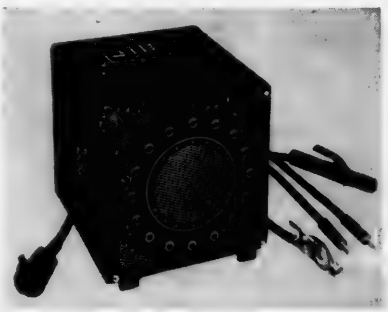
Its clean short flame, the company says, produces 80% complete combustion within the burner and utilizes residual fuel oil as well as most conventional fuels.

Burners can be converted from one fuel to another without shut-down and are designed for a high heat release of more than 1,000,000 Btu per cu ft. They are offered in four standard models with outputs ranging from 3.5 to 18 million Btu per hr. Other sizes available on special order. Illustration is from Bulletin 111, available from the company.

More information? Circle Item 11 on postcard, page 97.

Arc Welder Is Hand Portable

A hand portable industrial arc welder of 200 amp output is available from Brennen, Bucci & Weber, Inc., New York, N. Y. Weighing only 80 lb, Model 200B is



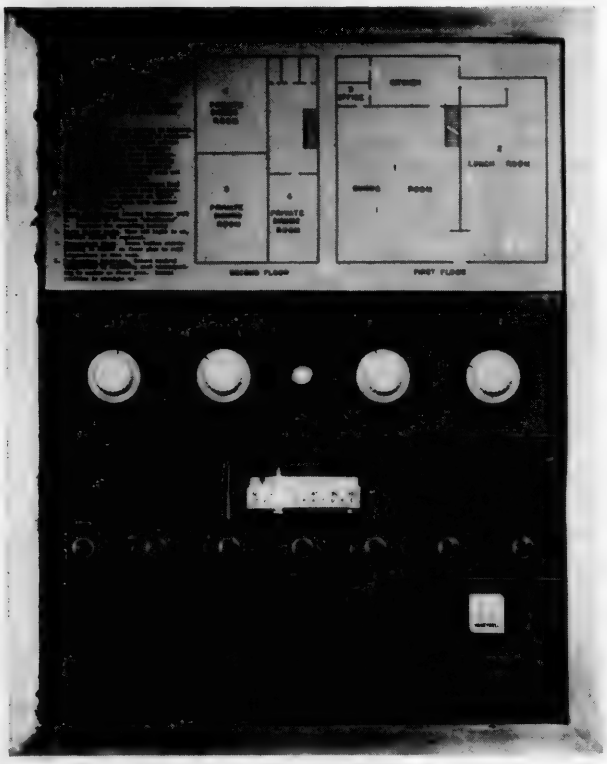
fan cooled for production use and is equipped with a thermal overload switch to prevent transformer burnout.

The welder employs the company's high efficiency transformer enabling it to perform the work of a conventional arc welder four to five times its size and weighing three times as much. This unit will weld steel 1½-in. thick and will cut steel ¼-in. thick. Overall dimensions are only 12 x 13 x 14 in.

More information? Circle Item 12 on postcard, page 97.

Baby Data Center

A central control panel is developed for control of comfort in small commercial or industrial buildings by Minneapolis-Honeywell Regulator Co., Minneapolis, Minn. Complete instructions are printed on the panel



and lights signal when various pieces of equipment are in operation. Size of unit depends on the number of control zones and other functions to be provided, but will normally be built so they can be mounted between conventional wall studding. System needs no engineer in attendance.

More information? Circle Item 13 on postcard, page 97.

Gray Glasses

Two gray glasses, a true heat-absorbing gray plate glass to be known as Solargray, and a gray heavy sheet glass under the Pennvernon label have been announced by Pittsburgh Plate Glass Co., Pittsburgh, Pa.

Solargray plate glass is a neutral gray polished plate glass possessing heat absorbing characteristics as defined in Federal specifications. Appearance and functional characteristics of the product are in keeping with the expressed needs and desires of the architectural profession, in keeping with the modern trend to multi-colored building interiors.

In ¼-in. thickness, the glass transmits approximately 45% of total solar radiant energy and is equal to present greenish-tint heat-absorbing glasses in this respect. Transmission of visible light has been reduced to approximately 40%. The product is said to have excellent stability equivalent to regular plate glass.

Gray plate glass is intended for use in office buildings, apartments, private residences, commercial, and institutional installations. It may also be used in double-glazed insulating windows. It will be immediately available in cut sizes up to 75 by 128 in.

Pennvernon gray heavy sheet glass is a neutral gray glass to be furnished in 3/16 and 7/32-in. thicknesses up to a maximum sheet size of 70 by 126 in. It provides brightness or glare control, transmitting only 53% of visible light. It also provides a significant reduction in the transmission of heat-controlling solar energy, although it is not a heat-absorbing glass in terms of Federal specifications.

Both glasses will be standard company products with long range availability for replacement purposes.

More information? Circle Item 14 on postcard, page 97.

Hot Water Circulator

Addition of Model 100 hot water circulator to its line of conversion, shell, and OEM oil burners is announced by Metalmaster Corp., Newark, N. J.

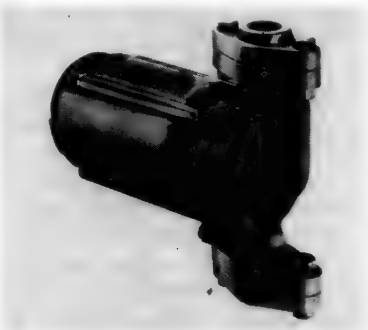
Circulator has rubber-mounted, self-aligning, overload protected motor, balanced impeller, hardened shaft, water-tight carbon and stainless steel seals, and extra-absorbent bearings. Full lift with vibration-free operation is promised.

Designed for full capacity for 1½ in., interchangeable flanges can be supplied for ¾, 1, and 1¼-in. application.

More information? Circle Item 15 on postcard, page 97.

Compact Booster Pumps in 6 Sizes

Lightweight compact booster pumps are now being manufactured in six sizes by Piqua Machine & Manufacturing Co., Piqua, Ohio. Designed to circulate heating and cooling water for homes, apartments, hotels and



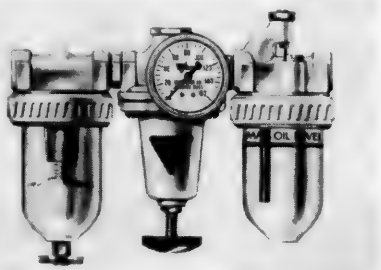
other buildings, the Enpo booster pumps are small and light, well suited for copper pipe mounting, and save much space that is otherwise wasted.

The company has incorporated many features in this line of pumps, one being the water-tight seal that may be replaced quickly when necessary without disturbing the plumbing. Another improvement is the large oil reservoir of the motors which seldom need refilling. All boosters use bronze impellers that are precision processed and dynamically balanced for quiet operation.

More information? Circle Item 16 on postcard, page 97.

Filter-Regulator-Lubricator Unit

A combination unit for the automatic filtration, regulation, and lubrication of air supply to pneumatically operated equipment is announced by Watts Regulator Co., Lawrence, Mass. Sizes currently available are ¼, ⅜, and ½ in.



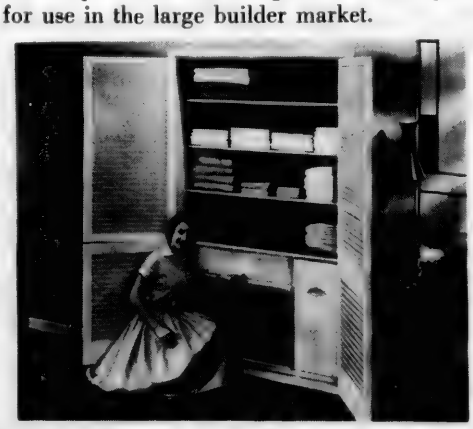
The filter design includes a contoured air passage which imparts a powerful downward spiral motion to the incoming air. After the centrifugal action, the air passes through a porous bronze filter element for final filtering before entering the regulator.

The regulator features an aspirator which provides instant compensation or regulation of the reduced pressure under conditions of widely varying flow demands. The lubricator is designed with a high velocity venturi section which assures practically 100% vaporization and assimilation of the metered oil.

More information? Circle Item 17 on postcard, page 97.

Heat Pump Efficiency Increased

The new Weathertron heat pump is 50% smaller in size and ⅓ less in weight than any previous model, it is announced by Air Conditioning Div., General Electric Co., Bloomfield, N. J. At the same time, over-all efficiency has been increased by 17% in its heating and 32% in its cooling performance compared with earlier models. The new compact unit was designed to be competitive in price for use in the large builder market.



The size of the unit is ideal for slab or crawl space home construction. Its dimensions are 30½ x 33½ x 46 in. and can easily be built into the wall of the home. The new unit serves as a horizontal, vertical or down-flow air conditioning system. Servicing of the unit can be done conveniently from either the inside or outside. The return air grille, which is an accessory, and the filters may be located remotely from the unit when installed in a tucked-away waste space.

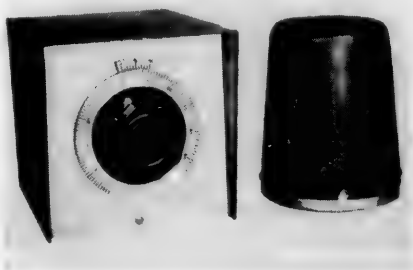
According to company engineers, the unit can be located at the bottom of a linen closet, as shown, irrespective of its depth. Louvered doors in the linen closet then provide the grille for return air flow.

More information? Circle Item 18 on postcard, page 97.

Remote Position Control

The Dialtrol, a new high accuracy, low cost, follow-up type of remote control, has been announced by The Jordan Co., Inc., Milwaukee, Wis.

A vernier dial on the face of the control, illustrated at left, is set to establish accurately the desired position of a valve, variable speed drive control, or damper. A control motor, with built-in or externally driven potentiometer, adjusts the valve, drive, jack, etc., until the proper setting is obtained. The company's Shaftrol, on



right, a shaft mounted control gear motor with built-in potentiometer, is designed specifically for use with the Dialtrol but other gear motors connected to suitable potentiometers may be used.

The control incorporates adjustable anticipation to slow down the control motor as the desired setting is approached. In this way, over travel is prevented and the desired setting is arrived at without hunting. The anticipation adjustment and an accuracy adjustment are located behind the hinged front panel. The accuracy adjustment permits introduction of lost motion which may be desired for certain applications.

More information? Circle Item 20 on postcard, page 97.

Plastic Tubing in Two Grades

A new product from Franklin Plastics, Inc., Franklin, Pa., is Dur-X Polyethylene tubing in sizes from ¼ to 1 in. Guaranteed against rot, rust and corrosion, the new tubing is available in two grades: translucent, known as Supreme T, and plain black, identified as Supreme B.

Supreme T, which is not recommended for applications involving exposure to continuous sunlight, is designed for use in home evaporative coolers, radiant heating systems, chemical, medical and pharmaceutical plants, and food processing operations, and is safe for drinking water use.

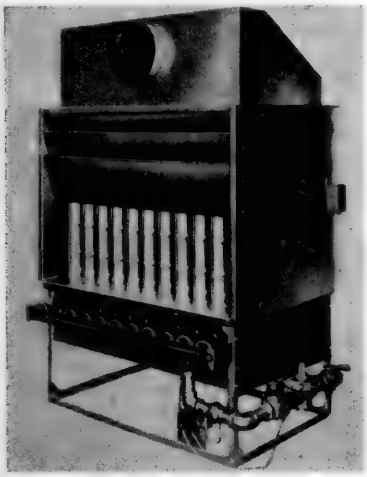
Supreme B is intended for more rugged jobs such as transmitting brine solutions for ice skating rinks, for air and gas lines, and conduit or vent lines.

More information? Circle Item 20 on postcard, page 97.

Aluminized Duct Furnace

Addition of an aluminized duct furnace to its line of forced air, space heating, and air conditioning equipment is announced by The Payne Co., Monrovia, Calif.

Primarily designed for commercial and industrial applications, furnace will be available in four basic sizes: 200,000, 280,000, 360,000, and 440,000-Btu inputs for



natural gas slightly lower for LP gases. Aluminized heat exchanger is said to have high corrosion resistance.

AGA approved for as low as 50-deg F temperature rise through the furnace, (no by-pass needed for ventilation in many cases), furnaces can be used in combinations up to 1,760,000-Btu input per hr.

More information? Circle Item 21 on postcard, page 97.

Condensate Disposal Pumps

Freedom of planning and installation of a self-contained air conditioner, disregarding the necessity of a gravity drain, is obtained by use of these automatic condensate disposal pumps manufactured by Kesco Products Corp. (a subsidiary of Island Refrigeration Service Co.) Springfield Gardens, N. Y.

With floor space at a premium, more ceiling-suspended air conditioners are being installed. A means is necessary to get rid of the condensate water without running a gravity waste line across the room when the unit is suspended in the middle of the ceiling, where it does the most good.

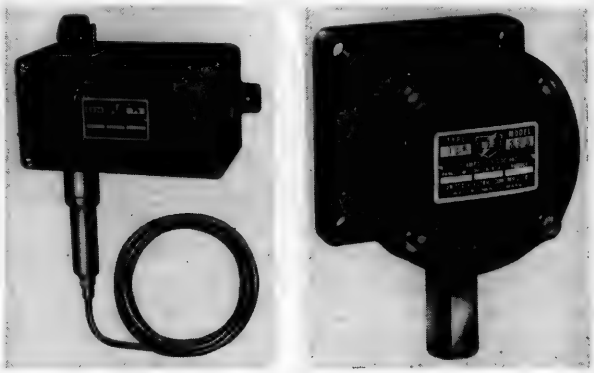
Condensate pumps will lift up to 20 ft, though they are small enough to fit inside the conditioner. This is sufficient to pipe the condensate to the nearest sink or to the roof of a one-story building.

King Size 1957 models start with 3 in. water in tank. Designed also for ice cube bins and drinking fountains, other capacity models are available. Heavy-duty air-cooled motor uses 110 or 220 volts a-c. Some units have 1 or 2-gal reservoir.

More information? Circle Item 22 on postcard, page 97.

Control Has Two Switches

Type E27A, a remote bulb temperature control manufactured by United Electric Controls Co., Watertown, Mass., contains two switches. In many applications, the company states, it may be used in place of two separate single-switch controls. Complete unit, shown at left, is



available with range spans of 100 or 200 deg F between limits of —150 deg and +650 deg, and with *on-off* differentials of approximately 1 and 2 deg. Adjusting screw, attached to each switch, permits adjustment to a maximum of 15-deg span.

Type J95, an explosion-proof pressure-vacuum control, is illustrated at right. It was described on page 156 in last month's News of Equipment and Materials.

More information? Circle Item 23 on postcard, page 97.

Outlets in Electric Baseboard

A duplex receptacle section for use with the company's baseboard heating panels has been added to the line of perimeter heating equipment manufactured by the Wesix Electric Heater Co., San Francisco, Calif.

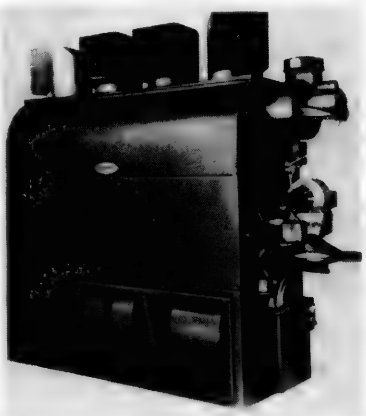
The six inch section has a double convenience outlet on the top and matches in appearance standard heating sections. Positioned flush with the top of the panel, the receptacle will not be damaged by carelessly moved furniture. The receptacle section is especially valuable to provide outlets along window walls where glass areas leave no room to install regular wall receptacles.

The receptacle section is easily installed between heating sections or at ends. Wiring is through knockouts located on the back. In meeting UL recommendations, the receptacle section has an enclosed raceway. Wiring can be run through the raceway to connect heating sections.

More information? Circle Item 24 on postcard, page 97.

Direct-Fired Heat Diffuser

An inexpensive, easy-to-install central heating plant for schools, churches, warehouses, factories, and other large-area buildings is announced by Carrier Corporation, Syracuse, N. Y., with the introduction of a new line of direct-fired heat diffusers.



No central boiler is required for this complete high capacity heating package, thus reducing the first cost below that of central systems. Factory wiring and pre-firing make installation easy. Only fuel and electrical connections have to be made and the unit vented before it is ready for operation.

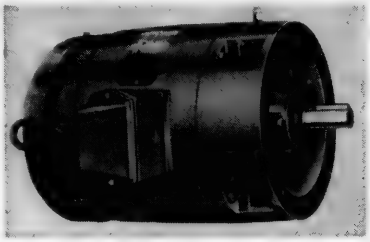
The direct-fired unit eliminates costly piping from a central steam or hot water source and heat loss enroute. It operates at high efficiency converting at least 80% of its consumed fuel into usable heat. The heat diffuser is available in any of 10 sizes burning either gas or oil, and delivering anywhere from 300,000 Btu per hr in the smallest unit up to 2,000,000 Btu per hr in the largest.

More information? Circle Item 25 on postcard, page 97.

Vertical Pump Motors

Totally-protected, vertical solid shaft P-base motors for all vertical pump installations are announced by Reliance Electric and Engineering Co., Cleveland, Ohio.

Motors, with normal thrust bearings in all sizes from 1 to 40 hp and high thrust in sizes from 1 to 15 hp, are



available in protected, totally-enclosed, or explosion-proof enclosures. The standard enclosure meets UL specifications for performance under conditions covered by Class I, Group D, and Class II, Groups E. F and G.

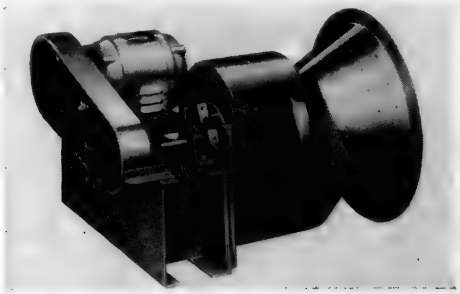
Designed for indoor and outdoor installations, all of the motors are corrosion-proof for long, safe operation under adverse conditions as are frequently found in the process industries. The shaft is sealed by a neoprene slinger that protects bearings and windings from foreign matter. The mounting flange face and rabbet fits are machined after assembly to assure perfect mating with the pump flange and to provide positive shaft alignment. Exclusive Metermatic lubrication automatically regulates the correct flow of lubricant to the bearings. Automatic grease relief prevents bearing damage from grease pressure or over-lubrication.

More information? Circle Item 26 on postcard, page 97.

Process Blower

A special blower for preforming in the fiber glass industry, was delivered recently by the Master Fan Corp., Los Angeles, Calif.

Supplied for Finn and Fram, Engineers, the unit will be used by Swedlow Plastics Company for making preforms.



With this blower, cut glass is sucked uniformly against form screens and held by air pressure as fibers are deposited and binder is applied. The preform is cured, then later molded with resin and heat to make finished parts of many shapes and uses.

The preform unit is combined with other elements to provide exceptional versatility and speed in new set-ups. Exceptional production rates are anticipated. Operation can be manual or fully automatic.

More information? Circle Item 27 on postcard, page 97.

Control Maintains Correct Draft

Automatic draft control to provide maximum combustion efficiency of gas, oil or stoker-fired equipment is now available in a new line of combustion instruments offered by General Controls Co., Glendale, Calif. Cast-aluminum cases permit either flush or surface mounting as desired.

Close control of overfire draft is provided by this automatic system. The draft program control, in conjunction with modulating damper actuator, maintains a correct draft for all firing conditions and also assures safe starting by opening the uptake damper prior to burner ignition. Manual switches, convenient terminal facilities, and relays are provided within a compact unit.

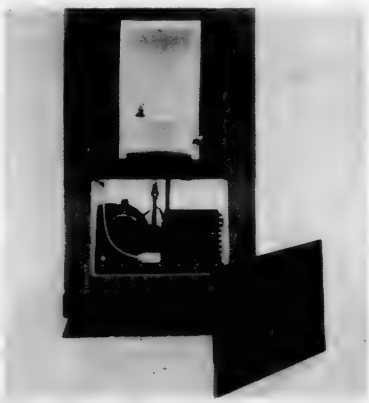
Companion instruments optionally available for closer surveillance and additional accuracy are flue gas temperature indicator for detecting wasteful firing conditions, draft gage for indicating amount of draft affecting combustion rate and steam pressure controller-indicator which controls fuel rate to burner in response to steam pressure changes.

More information? Circle Item 28 on postcard, page 97.

Wall-Mounted Water Cooler

Introduction of a new type of Oasis Water Cooler, designated In-A-Wall, is announced by The Ebco Manufacturing Co., Columbus, Ohio.

Remote applications of this water cooling unit are meeting wide acceptance by architects, home owners, and builders. The unit is adaptable for mounting to any



basement's overhead joists. It is a neat, compact and efficient unit, with both the drain and adjustable thermostat located in front for easy accessibility.

The cooler is designed to provide custom-tailored water cooling with functional appeal. A grill covers the unit when installed in or behind a wall, and it is available from the manufacturer either in stainless steel, or with a prime coat ready for painting. The units are available in two sizes: Model IW-5, which supplies 5 gal per hr, and Model IW-10, supplying 10 gal per hr.

More information? Circle Item 29 on postcard, page 97.

Under-window Conditioners

Introduction of a line of Welbilt-in air conditioners for under-window installation is announced by Welbilt Corp., Maspeth, L. I.

Conditioner is the self-contained type which permits installation of a complete air conditioner with case inside a second outer sleeve. This simplifies installation or removal for service and protects the inner chassis when installed.

All units are equipped with thermostatic controls, adjusted louvers, and fresh air intake and exhaust; ¾-hp units available in models including a 7.5 amps model. One-hp air conditioners are available for 115, 230, or 208 volts. Permanent filters, push button controls, 2-speed fans, and heaters are extra equipment.

There is no inside or outside projection for apartment house installation. For 8 or 12-in. walls, the small projection may be either inside or outside, at the option of the builder.

More information? Circle Item 30 on postcard, page 97.

Booster Pump for Extra Head

A booster pump is developed by Bell & Gossett Co., Morton Grove, Ill., called the 1" PR Series. Pump is designed especially for in-the-line installation in circulating water systems requiring additional pressure head without additional pumping capacity.

In all capacities under 20 gpm, pump will develop greater head than the conventional type 1-in. booster pumps. Where the capacity requirements are less than 10 gpm, it develops even higher pressures ranging from ⅓ to ½ again as much as existing high velocity types.

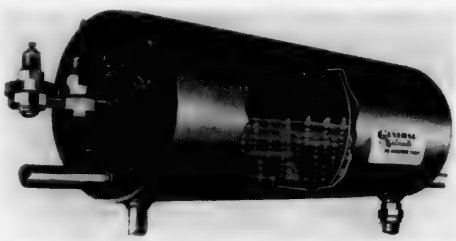
Booster is well suited to chilled water systems or combination heating and cooling systems where there is considerable pressure drop through a water chiller, condenser, or series of fan-coil units. Supplied in bronze, pump is also well adapted to recirculating faucet water systems in the home, providing the convenience of hot water instantly available at all fixtures.

Available in iron or bronze construction, utilizing the same basic parts that are found in the company's standard line of horizontal boosters, units include silent-operating 1/6-hp, 1750-rpm motors manufactured by the company especially for circulating pumps.

More information? Circle Item 31 on postcard, page 97.

Hot Water Deaerating Tank

Designed by General Automatic Products Corp., Baltimore, Md., for installation in any hot water heating system, the Dual De-Airator Tank effectively traps and prevents air from getting into the heating system, assuring



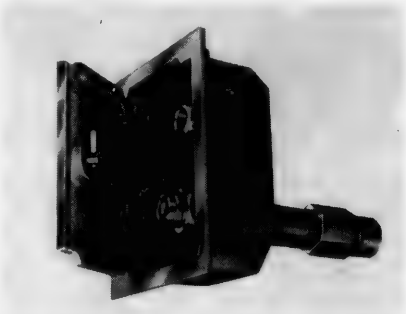
a steady flow of water at full rated capacity. When demands are made upon the system for more heat, the tank provides a gradual build-up, thus eliminating shock and expansion noises. It prevents air clogging and makes air vents unnecessary.

The tank is complete and comes in three sizes. All units are equipped with one automatic pressure reducing and relief valve and two key air vents. The three sizes are No. 1 for up to 500 sq ft hot water radiator, No. 2 for up to 1000 sq ft, and No. 3 for up to 1500 sq ft.

More information? Circle Item 32 on postcard, page 97.

Non-Freezing Wall Hydrants

New commercial models, No. 150 and 160, have been added to the non-freezing wall hydrant line manufactured by Ken-Ray Brass Corp., Vermont, Ill. Each wall hydrant is encased in a brass box, providing a fully-enclosed and fully-protected installation in any type masonry construction.



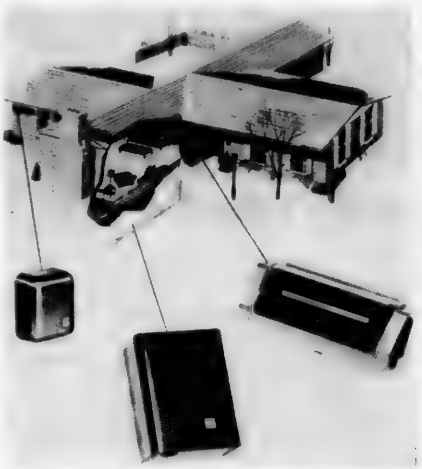
The hinged box cover can be locked shut to prevent tampering. Removable metal key unlocks door and operates hydrant. Standard box is supplied with polished brass face but is available in chrome, nickel or bronze. Both models have a renewable nylon seat and are of heavy duty construction.

More information? Circle Item 33 on postcard, page 97.

Thermistors Control Comfort

Thermally sensitive resistors referred to as thermistors are the elements that perform the important function in Detroit Controls Corp., Detroit, Mich., indoor-outdoor temperature control system called the Weather Minder.

Mounted outside the home, the thermistor unit signals temperature changes (to within a fraction of a degree) to the control panel that serves as a central control between the room thermostat, the thermistor outdoor unit, and the heating equipment.



With these three units, system automatically raises indoor temperatures as the outdoor temperature falls, and conversely lowers indoor temperature during mild weather. Home owner sets the pointer on the indoor thermostat at the temperature he feels most comfortable, and the temperature will be lowered or raised automatically as the weather changes.

The manufacturer states that this system is inexpensive, simple to install, is completely automatic, has no vacuum tubes, and requires no adjustments.

The temperature control system comes complete with the CA-407 outdoor thermistor unit, the CA-290 control panel and the CA-406 thermostat.

More information? Circle Item 34 on postcard, page 97.

Steam Pressure Reducing Valve

A pressure reducing and regulating valve for steam service, featuring built-in pilot and main valve strainers, is introduced by A. W. Cash Co., Decatur, Ill.

Known as the Type 44, the valve is a single seat, internal pilot-operated, piston-actuated model which is highly sensitive and responsive to the smallest changes in reduced pressure. The strainers reduce maintenance to a minimum over long periods of service, according to the manufacturer, and are easily removable for cleaning or replacement without removing the valve from the line. Maximum inlet pressure is 250 psi at 400 deg F, and delivery pressures range from 5 to 250 psi. The valve is also available with external sensing line. Sizes are 2, 2½, 3 and 4 in. with iron body and flanged ends.

More information? Circle Item 35 on postcard, page 97.

Gas Heating Equipment Line

Improvements in its line of gas heating equipment are announced by Temco, Inc., Nashville, Tenn. Among the major changes is the development of a built-in draft relief on the wall heaters, which substantially lowers stack temperatures. The blower attachment on the wall heater, which provides more rapid circulation of heated air, is now available for the single wall model as well as the dual wall model.

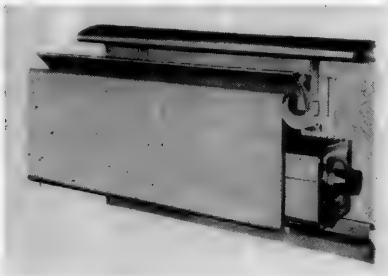
A change in the space heater line is the use of a diffusion type blower assembly which provides a more even flow of warm air at floor level.

Air conditioning equipment now includes 2 and 4-hp self-contained multi-zone units with pre-fabricated duct work. A suspended air-cooled air handling unit for commercial application has been added to the line.

More information? Circle Item 36 on postcard, page 97.

Baseboard Convector Is 8-In. High

An 8-in. high baseboard convector, designated Special by Kritzer Radiant Coils, Inc., Chicago, Ill., is available. The baseboard incorporates all of the company's features such as snap-in brackets, sliding shoes, and snap-on accessories, including inside and outside corners, joint



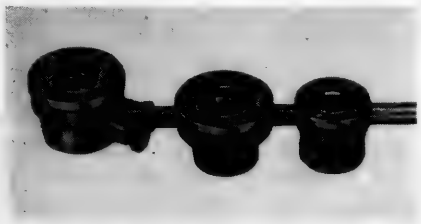
covers, and wall strips. A device, Thermovane, acts as a finger tip controlled damper and air splitter vane for maximum heating efficiency.

The baseboard is completely packaged in 4, 5, 6, and 8-ft lengths, including the damper control and a joint cover in 2¾ and 3¼-in. widths. Heating coils of copper tube-aluminum fin or steel tube-steel fin construction are optional.

More information? Circle Item 37 on postcard, page 97.

Drophead Ratchet Pipe Threaders

Two new Pipemaster drophead ratchet pipe threaders with segmental dies are announced by The Erie Tool Works, Erie, Pa. The ratchet threaders are offered in two size ranges: No. 1PR in all sizes from ⅛ through 1¼ in. and No. 2PR in all sizes from ⅛ through 2 in.



The die heads on the drophead threaders change instantaneously, yet cannot fall out. Two-way ratchet is provided for easy back-off. Dropheads work equally well for hand or machine operation and are designed so that chips clear themselves, chasers are self-starting, and a nominal amount of oil is necessary.

More information? Circle Item 38 on postcard, page 97.

Space Heating Control Switch

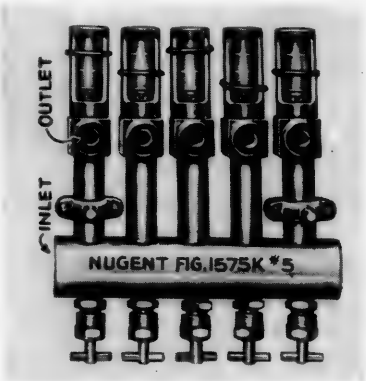
A simple, motor-operated, relatively noiseless switch for changing voltage in order to control space heating systems is developed by Wesix Electric Heater Co., San Francisco, Calif. The switch, in trial service for more than seven years, has become an essential component of a good space heating system which is complicated by changing seasons and weather conditions.

Household heating systems range in capacity from 6 to 30 kw, and the switch is capable of handling loads of this magnitude at the customary household voltage of 240 volt a-c. The quiet operating characteristic of the device makes it possible to locate the switch within the space heater cabinet rather than in a remote location. This type of switch requires energy to open as well as to close, necessitating the use of double-throw thermostat operation but otherwise involving no complicated wiring. Two and three-pole devices rated at 240 v, 100 amp, and 480 v, 70 amp, have been accepted for listing by UL.

More information? Circle Item 39 on postcard, page 97.

Pressure Sight Flow Lubricator

A pressure sight flow lubricator is announced by Wm. W. Nugent & Co., Inc., Skokie, Ill. This unit will deliver lubricating oil or other liquids under pressure, in accurately measured quantities, to high or otherwise inaccessible points. They are available as single units or



in multiples to 15 depending upon the number of feeds required.

Each lubricator making up a multiple unit is capable of feeding fluid in amounts varying from several drops to two pints per min by simple adjustment of the individual needle valves.

Single lubricators are available with ¼ or ⅜-in. IPS inlet and outlet. Inlet sizes of multiple units range to ¾-in. IPS with ¼ or ⅜-in. outlets. All are designed for 125 psi maximum working pressure.

More information? Circle Item 40 on postcard, page 97.

Induced Draft Cooling Towers

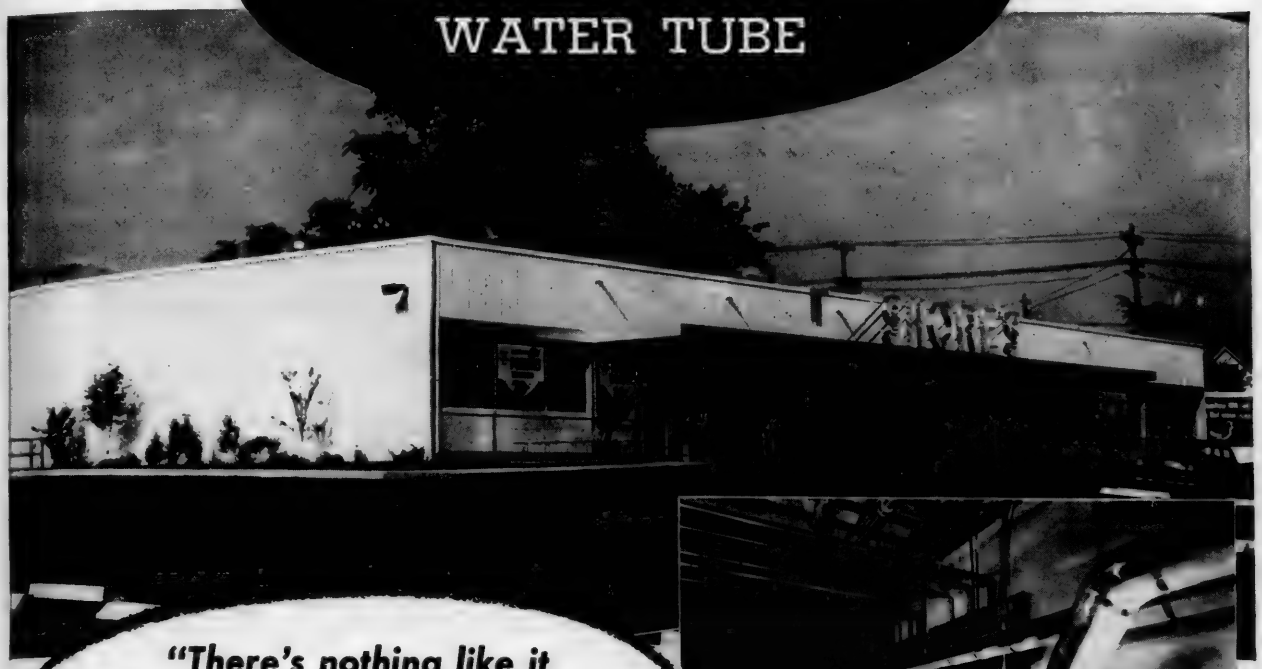
A complete line of cooling towers for the air conditioning and refrigeration industry is announced by Fluor Products Co., a division of The Fluor Corporation, Ltd., Whittier, Calif.

Volume production on the Series 3 cooling tower, first in a series of four basic models is now under way. It is an induced draft type with redwood structural components, designed specifically for central station air conditioning and refrigeration systems in commercial and industrial plants, and furnished in a multiplicity of cell sizes to fit all architectural requirements.

More information? Circle Item 41 on postcard, page 97.

(*Continued on page* 112)

what they're saying about REVERE COPPER WATER TUBE



"There's nothing like it for running refrigeration lines, for economy and for ease of installation." says, William N. Harris, President
WILLIAM N. HARRIS, INC.
Pawtucket, R. I.

Architects: ESHBACH, PULLINGER, STEVENS & BRUDER. Consulting Engineers A. ERNEST D'AMBLY, both of Philadelphia, Pa. Revere Distributor: R. I. REFRIGERATION SUPPLY COMPANY, Providence, R. I. Above photo shows compressor line-up in this 65-ton-capacity refrigeration layout. When you consider how long it would have taken if all the piping connections on this job had to be threaded, then you can readily understand why architects, contractors and engineers use Revere Copper Water Tube with soldered or brazed joints.

"As a refrigeration contractor I've found that nothing equals copper water tube for refrigeration and air conditioning lines. You can work in the tightest corners because the solder or brazed joints you make need no wrench room and you never have to worry about rust clogging the lines when you use copper tube. And because copper tube always makes a neat installation and is bright and shiny, you need never worry about exposing it. All things considered, copper costs less to install, too."

The words may be different, but we keep hearing the same saving story again and again. So why take chances? See your Revere Distributor for your copper water tube needs. And if you have technical problems, ask him to get in touch with our Technical Advisory Service for you.

Above photo shows insulated copper tube supply and return lines connecting cooling tower to compressors in Shore's Supermarket, East Providence, R. I. 2,500 FEET OF REVERE COPPER WATER TUBE in sizes from ½" to 3" were used. Refrigeration included storage room for frozen foods and meats, counter storage and sales areas.

REVERE COPPER AND BRASS INCORPORATED

Founded by Paul Revere in 1801

230 Park Avenue, New York 17, N.Y.

Mills: Baltimore, Md.; Brooklyn, N. Y.; Chicago, Clinton and Joliet, Ill.; Detroit, Mich.; Los Angeles and Riverside, Calif.; New Bedford, Mass.; Newport, Ark.; Rome, N. Y. Sales Offices in Principal Cities, Distributors Everywhere.

COPPER ★ BRASS ★ 18 01 ★ REVERE ★ ALUMINUM

(*Continued from page* 110)

Room Cooling-Central Heating

Dual purpose room air conditioners which contain heat convectors that connect to steam or hot water pipes are announced by Electric Appliance Div., Westinghouse Electric Corp., Mansfield, Ohio.

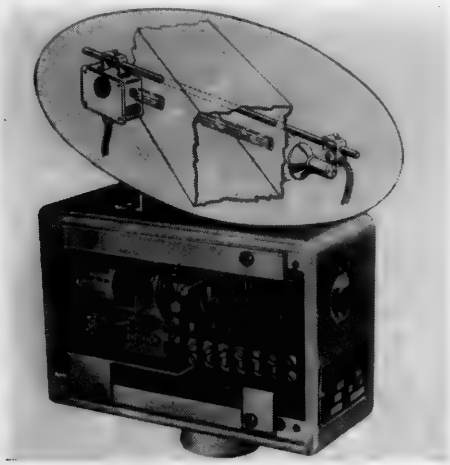
Designed to fit under a window without destroying the symmetry of the room, it is 31 in. wide. Along its top front is a sloping control panel which the user can reach without stooping. The cooling mechanism of the company's streamliner unit is utilized, available in ¾ or 1-hp capacities, for 115 or 230 volts a-c.

Photo shows unit being slid into sleeve or casing which has been installed under a window. Finned coil is visible at top.

More information? Circle Item 42 on postcard, page 97.

Electric Eye Smoke Alarm

No maintenance need be anticipated for its Type SM1 electric eye smoke alarm, states the manufacturer, Photobell Co., Inc., New York, N. Y. As a result, it is suitable for use with unattended heating plants, as are often found in apartment houses and other small buildings.



An automatic oil burner will smoke briefly every time it recycles. This is legal in most communities, provided that the interval of smoking is short. This smoke alarm may be arranged to sound an alarm if the smoke continues above one minute or so, and then to shut down the oil burner to avoid a smoke penalty. The attendant then recycles the oil burner when he returns.

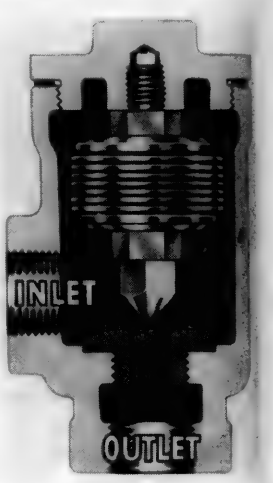
The electric eye has no electronic tubes, internally-generated heat, or warm-up delay It is encased in cast-iron to keep out dust and smoke. An ordinary lamp is used for exciting the photocell, and its replacement is simple for anyone without experience.

A typical installation is shown in the sketch, with both lamp unit and electric eye unit mounted on a short piece of ½-in. pipe or conduit passing right through the smoke duct. This is one of many simple mounting arrangements.

More information? Circle Item 43 on postcard, page 97.

Thermostatic Steam Traps

Production of a series of low cost thermostatic steam traps is announced by The Clark Mfg. Co., Cleveland, Ohio.



Designated Series A, traps operate on a temperature differential principle as contrasted to buoyancy. Of cast semi-steel construction, they are suited for installation requiring frequent shutdowns and startups, elimination of large amounts of air or maximum protection against freezeup. Traps are provided with bronze or monel bellows and vertical outlets.

An orifice operates the entire pressure range from 0 gauge to maximum rated pressure, steam pressures up to 250 psi and temperatures up to 450 deg F. Inlet and outlet connections provided are ½ and ⅜ in. Angle or straight-through piping is optional.

More information? Circle Item 44 on postcard, page 97.

Valve Stem Packings

Two new styles of asbestos braid jacketed plastic core valve stem packings for high pressure and high temperature service are announced by The Garlock Packing Co., Palmyra, N. Y. Designated Styles 5855 and 127, the packings both utilize inconel wire in the packing jacket.

Style 5855 is for general service stem valve packing where conditions are not extreme, such as top stuffing box temperature range of 500 to 600 deg F. Pressures of several thousand psi can be well handled providing the valve is designed to stay within the temperature limitations.

Style 127 is for use in packing any fluid which will not affect the asbestos. It is ideally suited to extreme heat conditions, such as box temperatures of 750 deg F and pressures to several thousand psi.

More information? Circle Item 45 on postcard, page 97.

(*Continued on page* 114)

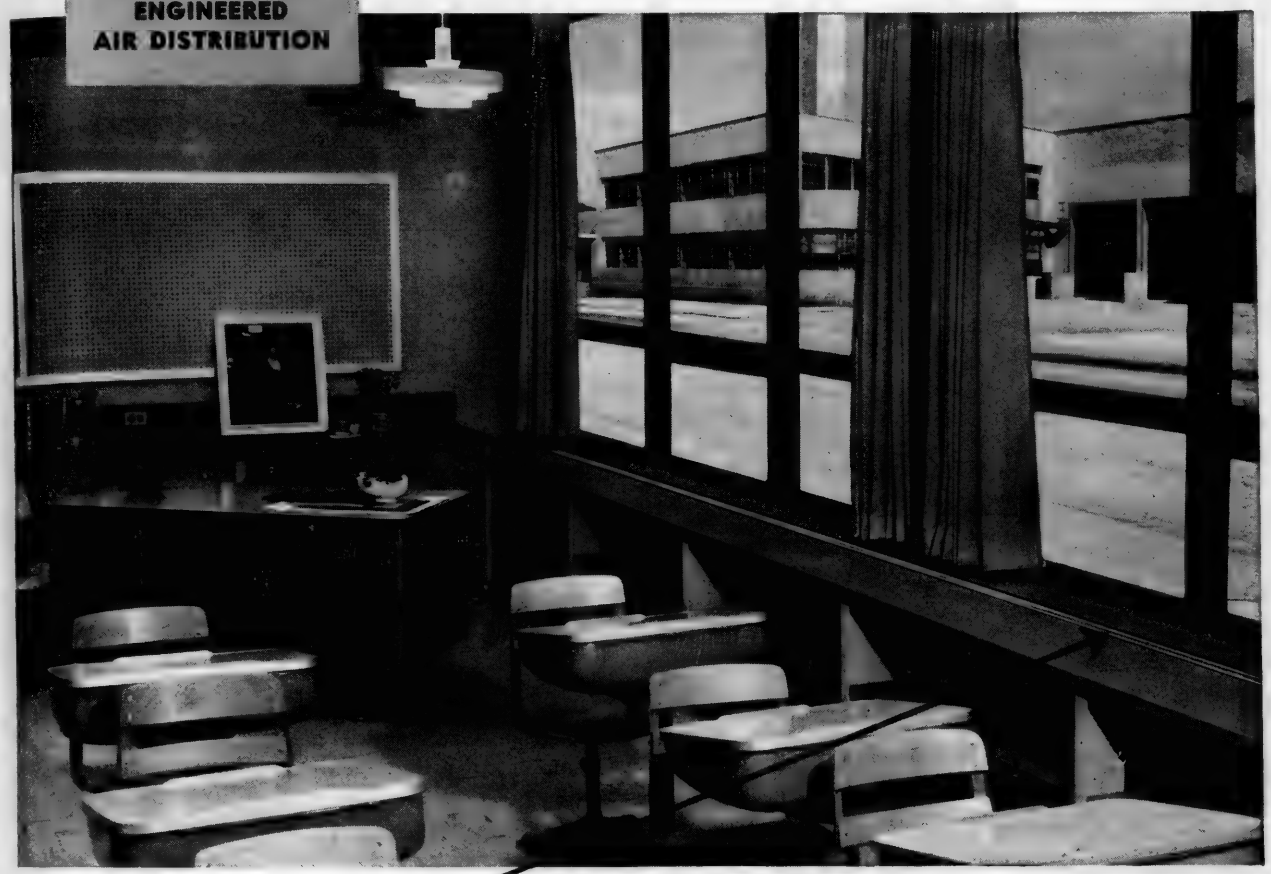
THE MARK OF QUALITY

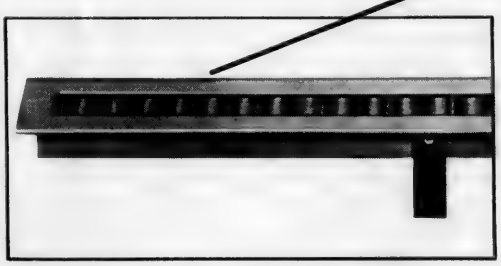
BARBER COLMAN

Uni-Flo

ENGINEERED AIR DISTRIBUTION

"Curtain" of warm air from continuous line diffuser stops cold glass-area drafts





The new Uni-Flo Model ST Grille is available in increments of 48 inches for continuous line application. Used chiefly on plenum under windows, also applicable as a wall diffuser.

To prevent cold air currents that flow down large glass areas and spill into the room, Barber-Colman Company recommends the Uni-Flo Continuous Line Diffusing Grille. The grille is installed beneath the entire bank of windows, as in the modern schoolroom shown above. Warm air deflected against the chilled window in one continuous "curtain" warms the surface and neutralizes downdrafts. The Continuous Line Diffusing Grille can also be used to provide draft-free distribution of conditioned air for cooling and ventilating as well as heating. Field data is available, and performance of the grilles is guaranteed when they are applied according to published data. Get complete details from your nearby Field Office, or write us today! Only Barber-Colman Company combines skills in both Air Distribution and Automatic Controls for *undivided* responsibility.

BARBER-COLMAN COMPANY

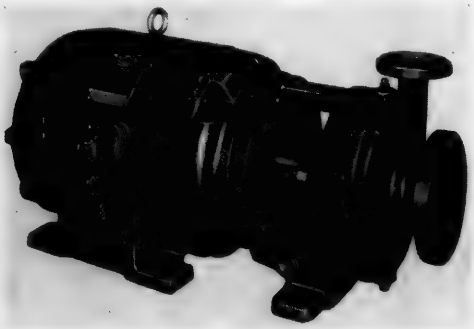
Dept. O, 1102 Rock Street, Rockford, Illinois • Field Offices in principal cities

Air Distribution Products • Small Motors • Automatic Controls • Industrial Instruments • Aircraft Controls • Electrical Components • Overdoors and Operators • Molded Products • Metal Cutting Tools • Machine Tools • Textile Machinery

(*Continued from page* 112)

Line of Standard Pumps

For the pump user who wants to conserve on both space and investment, Dean Brothers Pumps, Inc., Indianapolis, Ind., offers a line of standard, close coupled, centrifugal pumps, Type GSC, designed to handle a wide range of general applications where conditions do not necessarily require a more costly engineered pump.



Included are seven pumps with capacity up to 600 gpm and total dynamic head up to 275 ft. Temperature range of liquids that can be pumped is from —40 deg F to +250 deg.

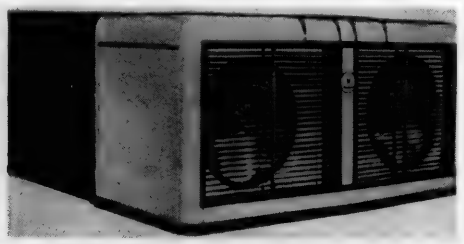
Available from stock in materials of three standard classifications, bronze fitted, all iron, and all bronze, the line parallels the manufacturer's Type GS line of standard cradled pumps in sizes, basic mechanical design, and construction.

Standard construction includes a removable back head to permit removal of the impeller without disturbing the piping, a large cradle opening for free access to the stuffing box, and a stuffing box adaptable interchangeably to packing and mechanical seal.

More information? Circle Item 46 on postcard, page 97.

Five-Ton Cooler Can Be Split

No interior ductwork or water connections are needed to install the Super-Five, announces Aug. G. Barkow Mfg. Co., Milwaukee, Wis., manufacturer of this 5-ton self-contained air conditioner designed for supermarkets, large offices, factories, and recreational institutions.



Normally installed through the wall, with a 24-in protrusion into the air conditioned space and 22 in. outside, it may be split, the high side condensing unit being out of doors and the low side evaporator suspended from the ceiling. Unit is 50 in. wide, 24 in. high, and 61 in. long. It cools, ventilates, recirculates, brings in any desired percentage of outside air, and exhausts.

A 4-way thermostat, a high-low voltage panel, and a high-side cut-out to stop condenser fans when outdoor temperature is too low are provided. Rubber-mounted propeller fans circulate 2280 cfm through evaporator section. During cooling cycle or exhaust, 5000 cfm are pulled through the condenser section. Current requirements are 208-220 volts, 3 phase, 60 cycle, or 230 volts, single phase, 60 cycle.

More information? Circle Item 47 on postcard, page 97.

Hermetic Compressors to 60 Hp

Expansion of its line of hermetic reciprocating compressors to include 15 to 60-hp sizes is announced by Carrier Corp., Syracuse, N. Y.

Open drives employing belt and pulley, a gear box, or other couplings are eliminated. Compressor and motor are mounted on a single shaft which is hermetically enclosed, sealing out dust and dirt. Passage of the refrigerant gas through the motor housing to cool the motor adds to the efficiency, the company states. Because seals are eliminated, refrigerant gas leakage is avoided. Virtually vibrationless, noiseless operation is promised.

Unit consists of motor-compressor mounted on vibration isolators on top of a condenser. Starting box mounted on the condenser will contain starting equipment, high-low cut-out, oil safety switch, discharge, suction, and oil pressure gages. The appropriate starters will be furnished, depending on the electrical supply.

More information? Circle Item 48 on postcard, page 97.

Air-Powered Sump Pumps

Introduction of two new self-priming air-powered sump pumps with capacities ranging from 222 gallons a minute at a 30-foot head to 20 gallons a minute at a 200-foot head is announced by Atlas Copco Eastern, Inc., Paterson, N. J.

The high capacity pumps weigh approximately 50 lb and operate on pressures of 85 psi. They can be used for pumping clear or dirty water, oil, sewage and moderately heavy sludge.

The pumps, designated LPC-21 and LPC-41, consist of one-piece housings containing vane type motors and impeller type centrifugal pumps. Company spokesmen report they will operate when wholly submerged and will start under full loads.

The 22½-in. long LPC-21 pump will lift 37 gpm to a height of 100 ft. The LPC-41, also 22½-in. long, will lift 20 gpm to a 200-ft head.

More information? Circle Item 49 on postcard, page 97.

(*Continued on page* 116)

New hospital

or existing hotel...

QUIET AIR CONDITIONING is especially desirable in hospitals and rest homes. In addition, patients can choose their own degree of comfort.

DETROIT STATLER HOTEL recently installed its first group of AIRditioners.

Modine AIRditioners are the quiet, fingertip answer to year-round comfort

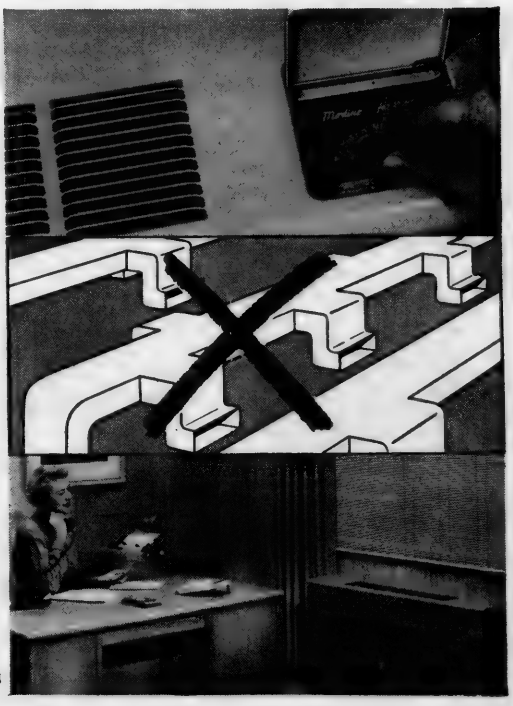
A TURN of the dial . . . and Modine AIRditioners deliver the desired air-conditioned comfort—quietly, instantly, smoothly. This fingertip control provides personalized air conditioning for hotels, office buildings, apartments, hospitals, motels. AIRditioners assure initial economy, performance and style in new buildings. And they're ideal for remodeling existing ones . . . replacing unsightly radiators with attractive heating-cooling units.

Ask the Modine representative listed in your classified phone book for Bulletin 755 — or write Modine Mfg. Co., 1511 DeKoven Ave., Racine, Wisconsin

FINGERTIP control permits room occupants to select their degree of comfort.

NO DUCT WORK is needed. AIRditioners use same piping for water supply and return, plus drain . . . cost less to install.

A CHOICE of four enclosure types in capacities from 2/3 to 2 tons.



Modine Airditioners®

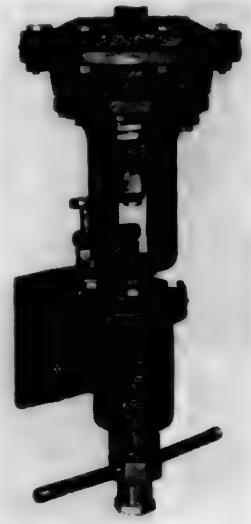
In Canada: Sarco, Ltd., Toronto

A-1314

(*Continued from page* 114)

Hydraulic Control Pilot

For use with diaphragm actuated regulating valves, pilot control valve No. 811 is announced by Atlas Valve Co., Newark, N. J. It responds to small variations in controlled pressures in the flow line, and thereby readjusts the main regulator for precise throttling of the steam, gas or liquid flow. Its action is positive. It accurately positions diaphragm control valves used either as reducing valves or unloading valves.



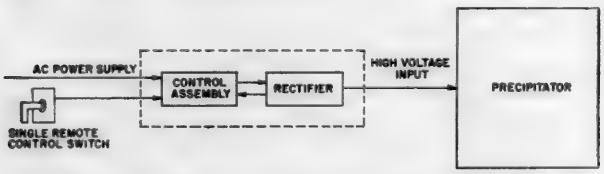
This pilot is a positive mechanical device designed to eliminate the costly and wasteful leak-off of hydraulic fluid while still retaining extremely sensitive control of the diaphragm control valve. Unit consists basically of a 2-way valve actuated by a diaphragm opposed by a loading spring. The adjustable pressure range is extremely broad and desired settings are easily adjusted. Controlled pressure ranges are 3 - 15 psi, 10 - 40 psi and 25 - 100 psi. A minimum operating pressure of 30 psi is required. The valve is fitted with pressure gages to indicate the inlet hydraulic pressure and the load line pressure to the diaphragm operated regulating valve being controlled.

More information? Circle Item 50 on postcard, page 97.

Automatic Precipitators

Automatic feedback control for electrostatic gas cleaning systems is announced by Research-Cottrell, Inc., Bound Brook, N. J. Industries employ these systems as an essential adjunct to efficient processing and maintenance of good community relations.

Precipitator is started by a *start-stop* switch. Rectifier power output is maintained at level for optimum performance. Since maximum efficiency requires that precipitators operate at voltages well above the threshold value for sparkover (as distinguished from flashover), in many cases at 50 to 100 sparks per min, provision must be made for rapid recovery of voltage after sparkover.



Optimum voltage and power input will vary with changing precipitator temperature, flow rate, composition, humidity of the gas being treated, and size and resistivity of the particles being removed. Its system, the company states, continuously monitors and readjusts the spark rate.

Accompanying diagram shows continuously operating feedback loop that compares actual current, voltage, and sparking conditions in the precipitator with ideal, preset reference levels determined by experimentation with precipitator and process.

More information? Circle Item 51 on postcard, page 97.

Recessed Panel Cooler

Air cooled and water cooled recessed panel coolers for central cooling or individual fountain supply is announced by Sunroc Corp., Glen Riddle, Pa.

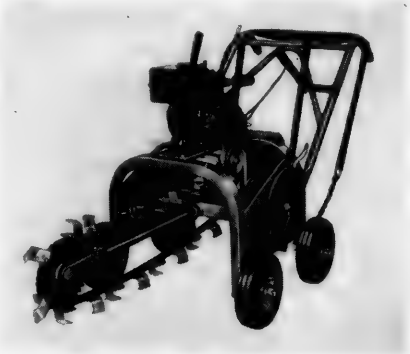
All water connections are $\frac{3}{8}$ in. IPT. Motor compressor is hermetically sealed 115 volts a-c except on the 42-gph model, it is 230 volts. Air cooled models are available in 6, 16, 33, and 42 gph sizes, and the water cooled model is rated at 17 gph.

As a central supplier, company recommends its use with wall fountains, in hospitals, offices, schools, factories. Its use is suggested in temporary installations, as where outside construction work demands a unit that can be readily changed to various locations.

More information? Circle Item 52 on postcard, page 97.

Portable Narrow Trench Digger

A trench digger called the POW-R-SPADE which completely eliminates the need for hand labor in digging narrow trenches for water, gas, and electric underground service lines is introduced by Stampings, Inc., Davenport, Iowa.

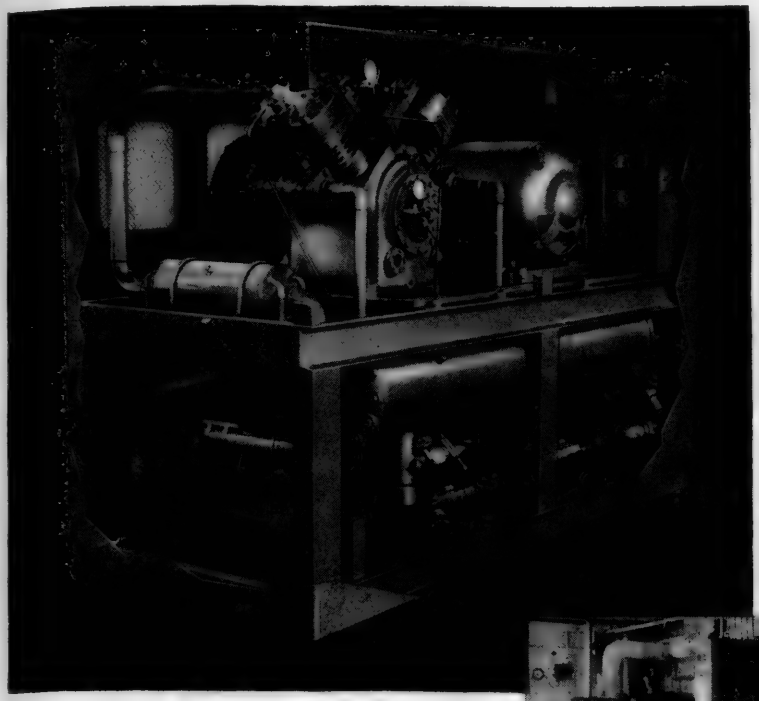


The device digs a 3-in. wide trench to any depth up to 24 in. It features specially designed removable cutting blades that are self-cleaning even in wet soil and deliver the dirt on each side of the trench without lumps or clods for easy back-fill.

A self-contained unit the digger needs no other vehicle for power. It has a well-known standard 4-cycle gas engine. All moving parts, with the exception of the wheels, are equipped with sealed ball bearings which never require lubrication. Wheels are equipped with Zerk fittings. The entire machine is shipped completely assembled.

More information? Circle Item 53 on postcard, page 97.

(*Continued on page* 118)



CALL ON

B&G

WHEN YOU NEED A

Package

LIQUID COOLER

OR *Component*

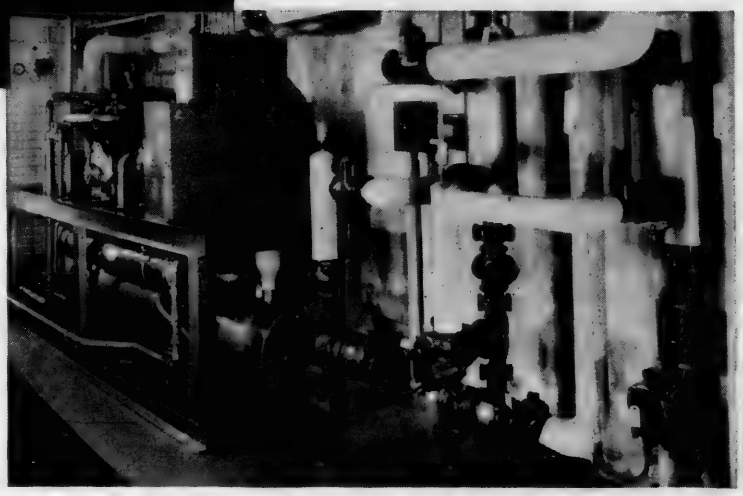
PARTS (MANY KEPT IN STOCK FOR FAST SERVICE)

Specifying "B&G" throughout for refrigeration and air conditioning installations assures you of two things. First, equipment which has demonstrated top quality performance for years. Second, a single manufacturer's responsibility for satisfactory operation.

When selecting pumps, B&G Series 1522 units invite your most critical comparison. Of vertical split-case design and equipped with the leakproof "Remite" Mechanical Seal, its *silent* operation is amazing in a pump of this character. Other B&G centrifugal pumps offer similar features for completely satisfactory performance.

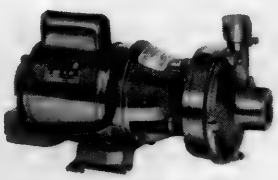
B&G Evaporators and Condensers all offer *plus* values in efficiency designing and rugged, long life construction. They are built to ASME Code requirements.

For a completely integrated and assembled water chiller the B&G Package Liquid Cooler offers many unusual features. Complete description and engineering data is given in new bulletin —send for your copy.



B&G Package Liquid Cooler, Booster Pumps, Flo-Control Valves and other auxiliary equipment used in combination heating and cooling system.

B&G Condenser



B&G Series 1522 Pump

B&G Liquid Receiver

B&G Evaporator

B&G Series 1531 Pump

B&G Heat Exchanger

BELL & GOSSETT

COMPANY

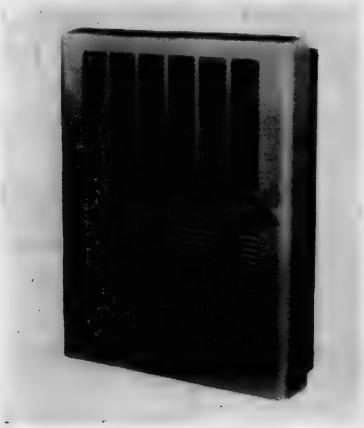
Dept. RES-4, Morton Grove, Illinois

Canadian Licensee: S. A. Armstrong Ltd., 1400 O'Connor Drive, Toronto 16, Ontario, Canada

(*Continued from page* 116)

Remote Heating and Cooling Unit

A remote heating and cooling unit, Model 100, is available from Ejay Baseboard Manufacturing Co., Winsted, Conn. A unit which provides full advantages of hot water heat in the winter as well as complete



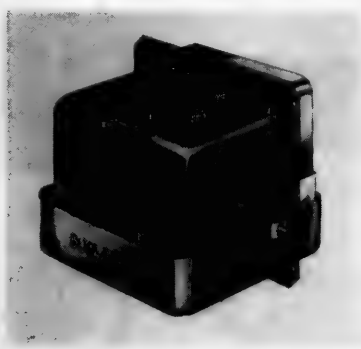
summer air conditioning, it is available in either recessed or free-standing models. The company reports that the unit has a heat rating of 11,000 Btu per hr and a cooling rating of 4800 Btu per hr.

Features of the unit include its completely insulated, non-metallic box which eliminates condensation, and ease of installation, accomplished through special attention in the design of the unit.

More information? Circle Item 54 on postcard, page 97.

Motor-Operated Furnace Humidifier

Engineered and designed by Arklon Manufacturing Co., Cleveland, Ohio, the new motor-operated Model 65 Bon-Air furnace humidifier provides complete, automatic, mechanical atomization of fresh water. Designed for use



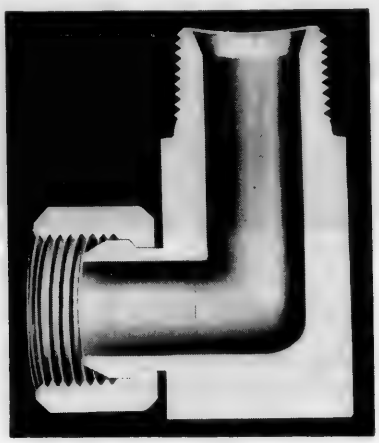
on all types of forced warm air furnaces, the compact humidifier installs quickly and easily in the furnace plenum, duct or counter flow furnace. There is no inventory problem as the one model humidifier fits all applications.

Completely automatic in operation, the device provides a positive, constant humidification output year after year. It operates quietly in conjunction with the furnace blower and provides humidification only when needed. There is virtually no restriction of air flow as the unit extends less than two inches into the air stream. Fresh water is picked up by a neoprene O-ring and deposited near the center of a revolving copper rotor, from which it is spun off or atomized into a fine, cool, fog-like mist that immediately disappears in the air stream. There is no free water released.

More information? Circle Item 55 on postcard, page 97.

Turbulence Free Adapter Union

A turbulence free fitting available in 45 and 90 deg adapter union models is available from Eastman Manufacturing Co., Manitowoc, Wis. A completely rounded



inner bore provides an entirely smooth radius to all angles, thereby eliminating turbulence and friction which results in heating and loss of pressure and efficiency.

Male ends of the adapter unions are tapered to eliminate the presence of any shoulder at the juncture of the adjacent fitting which further facilitates the flow of hydraulic fluid, thereby increasing power delivery and efficiency.

More information? Circle Item 56 on postcard, page 97.

Rectangular Panel Instruments

A new line of rectangular panel instruments of modern design and styling is announced by Simpson Electric Co., Chicago, Ill.

Called the Wide-Vue line, the instruments feature an open-face design and longer scale lengths. The 2½-in. size, for example, has the same scale length as a conventional 3½-in. panel instrument. The open-faced cover is designed to permit wide-angle readability of the instrument scales. According to the company, these instruments fill a definite need in the lay-out of modern panels.

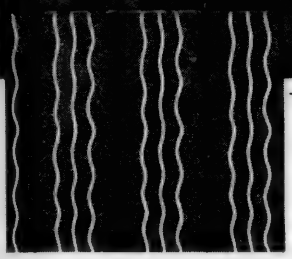
The panel instruments are custom-built in 2½, 3½ and 4½-in. models with any practical range, a-c and d-c. The durable plastic cover is formed in one piece and can be supplied in black or color finishes to match customer's equipment. Two movements are available: the company's standard magnet, or the self-shielded core magnet type.

More information? Circle Item 57 on postcard, page 97.

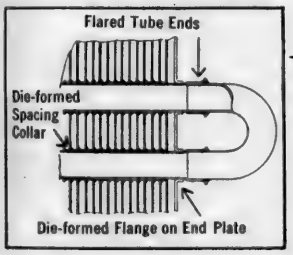
(*Continued on page* 120)

SO HALSTEAD & MITCHELL ASKED ENGINEERS

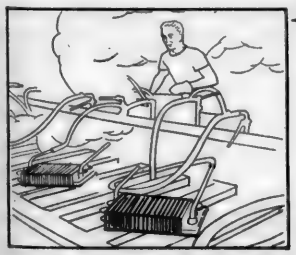
WHAT WOULD YOU CHECK TO FIND A BETTER FINNED COIL?



IS HEAT TRANSFER IMPROVED?
H & M's "Turbu-Flo" finned surface increases air turbulence between fins for better air-to-surface contact. With air film resistance lowered, heat transfer is markedly increased.



IS MECHANICAL DESIGN SUPERIOR?
H & M structural design severely restricts vibration and expansion-contraction effects. Die-formed spacing collars on the fins provide a rigid seat for a mechanical locking of fins to tubing.



IS TESTING "AIR-TIGHT"?
Every Halstead & Mitchell coil is tested for leaks with 300 psi air pressure under water. Coils are cleaned, dried by blow out with high pressure steam—then dehydrated in a 400°F oven.

If you want more detailed information describing the *better* finned coil with "Turbu-Flo," the *better* fin surface, please check the appropriate block to the right, and mail this ad with your name, title and company name and address to *Halstead & Mitchell, Bessemer Building, Pittsburgh 22, Pa.*

We are highly competitive folk, interested in the sale of large numbers of direct expansion coils, standard and non-freeze steam coils, and air-cooled condensers. We ask your engineers in this industry what features cause you to specify one finned coil over another—and our Halstead & Mitchell engineers then design to this extra-high level. We thought you'd be interested in points your engineers have stressed, for paying attention to them has boosted Halstead & Mitchell finned coil sales.

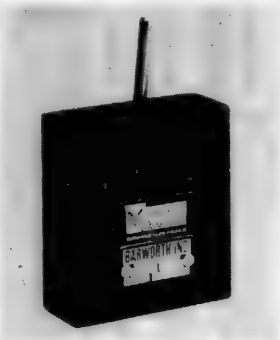
HM Halstead & Mitchell

- ☐ Air-Cooled Condensers, Bulletin AC-100
- ☐ Direct Expansion Cooling Coils, Bulletin DE-200
- ☐ Steam Coils, Standard & Non-Freeze, Bulletin S-200
- ☐ Special Evaporator and Condenser Coils to your specifications

(*Continued from page* 118)

Tiny Control Valve Is Adaptable

A device which functions as either a 2-way shut off or 3-way control valve is the 1½ x 1¾ x ⅝ in., 2 oz Micro Valve, available from Barworth, Inc., Summit, N. J. The advantages of the valve are its small size, sensitive control, fast tight shut off, and wide variety of services. Applications are pilot control of main and diaphragm valves, control of single-acting cylinders, and timing mechanisms.



Used in air, gas, oil, and water service, the valve employs an overcenter, snap-action control. Maximum travel of toggle is 8 deg either side of center. Operating pressures range from 0 to 100 psig.

More information? Circle Item 58 on postcard, page 97.

Waterless Air Conditioning Unit

A self-contained, waterless air conditioning unit is announced by Typhoon Air Conditioning Co., Division of Hupp Corp., Brooklyn, N. Y.

The unit was designed specifically for economical installation in small stores and offices. The unit can be

used with or without duct work, and can be located in a basement, crawl space, through-the-wall, or in a window or transom. The unit, called Economair, operates on a single phase, 60 cycle current at 230 v.

Two models having the same outside dimensions are available. TAS21, with a 2-hp compressor, 24,000 Btu per hr capacity, weighs 320 lb; TAS31, with two 1¾-hp compressors, 36,000 Btu per hr capacity, weighs 450 lb.

More information? Circle Item 59 on postcard, page 97.

Design Changes in Baseboard Line

Four major changes in its Deluxe baseboard for residential heating and the commercial CB Series are announced by Schemenauer Mfg. Corp., Holland, Ohio.

A new look has been given to the exterior by changing the radius of the damper vein to correspond with that of both the front and back panels. The hanger bracket has been redesigned for a more effective damper arrangement and for added rigidity to the front panel.

To provide for easier recessed installations, the end cap and access panel are now one unit. This, together with inside and outside corners and finishing strips, is hinged horizontally, the lower portion swinging upward for easy access to valve and vent on recessed installation.

More information? Circle Item 60 on postcard, page 97.

Push Buttons and Accessories

Designed for ease and accessibility of wiring, distinctive appearance and flexibility by Furnas Electric Company, Batavia, Ill., these heavy duty Oil Tight push buttons are rated to 550 volts ac-dc. Now, because of standardization and interchangeability, more combinations of push buttons are available with fewer parts.

This new line includes push buttons, selector switches, selector push buttons, pilot lights, and accessories. All units are built around one standard contact block. These contact blocks can be used singly or in tandem, mounted vertically or horizontally.

The operator consists of a metal button or selector knob which is free to slide or rotate within a metal sleeve. A special oil seal prevents oil from entering the enclosure and the switching mechanism. There are no diaphragms to rupture or puncture.

More information? Circle Item 61 on postcard, page 97.

Plastic-Wool Pile Weatherseal

Vinyl plastic-backed wool pile weatherseal shapes now available meet manufacturers' and builders' requirements for really tight door and window seals. The plastic bonded weatherseal, made by the Schlegal Manufacturing Co., Rochester, N. Y., has proven a boon to builders who recognized the value of its inherent toughness and versatility.

The permanent bonding of the wool fibers does not affect the vinyl's flexibility, and the suppleness of the plastic allows it to be threaded into window and door extrusions better than rigid weatherstripping. It easily follows irregular shapes and contours in window and door frame assemblies, and the plastic can't rust, corrode, or rot and is resistant to acids and cleaning solutions. Both wool pile height and plastic backing dimensions can be held to plus or minus .005 inch. The material, available with square, flat, beaded, round or serrated shaped plastic backing, is shipped in rolls, and requires little storage space.

More information? Circle Item 62 on postcard, page 97.

(*Continued on page* 122)

why engineers go for Gun-Pakt Expansion Joints

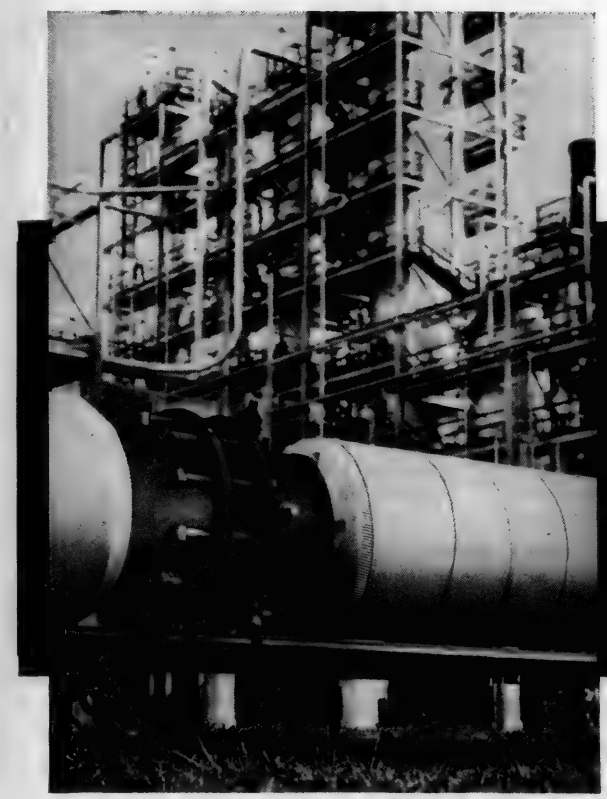
■ Engineers go for Yarway Gun-Pakt Expansion Joints because:

NO SHUTDOWNS. With Gun-Pakt Joints when new packing is needed, it is added under full steam pressure, right on the job —no unpacking, no shutdowns, no service interruptions.

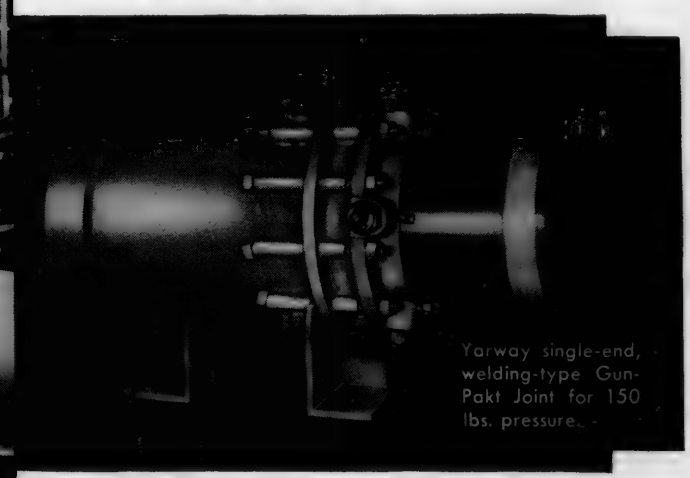
FEWER JOINTS NEEDED. With Gun-Pakt Joints you need fewer joints per length of pipe line, with traverses up to 12" single and 24" double.

LONG SERVICE—NO METAL FATIGUE. Gun-Pakt Joints give long, trouble-free service life—no fatigue failures.

LOW MAINTENANCE. Maintenance records show the costs for servicing Gun-Pakt Joints are very low. One utility reports only 65 cents per year per joint—another reports less than half that.



One of 37 Yarway Gun-Pakt Expansion Joints installed at giant oil refinery on Gulf Coast. Gun-Pakt Joints at this refinery range in size from 1½" to 14".



Yarway single-end, welding-type Gun-Pakt Joint for 150 lbs. pressure.

Leading institutions, central heating stations and industrial plants "go for Gun-Pakt" again and again. Write now for latest bulletin EJ-1914.

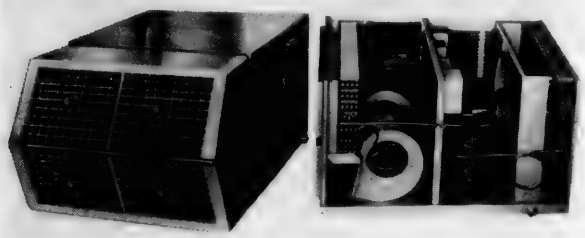
YARNALL-WARING COMPANY
104 Mermaid Avenue, Philadelphia 18, Penna.
BRANCH OFFICES IN PRINCIPAL CITIES

YARWAY GUN-PAKT EXPANSION JOINTS

(*Continued from page* 120)

Air Conditioning Line

Packaged air conditioners and prefabricated ducts are announced by Mitchell Mfg. Co., Div. of Cory Corp., Chicago, Ill. Included are a 5-hp air cooled residential air conditioner with remotely located air cooled condensing unit, a 4-hp central air conditioner, illustrated, for residences or for use as a pre-wired, through-the-wall commercial package, a line of blower coil units designed to overcome the inadequacy of some furnace blowers for air conditioning, and pre-fabricated duct kits.



Designed for application with the blower coil unit, the 5-hp unit may be purchased pre-charged and used with pre-charged tubing. It is available with either vertical or horizontal evaporator, in single-phase or three-phase, 230-volt, 60-cycle models.

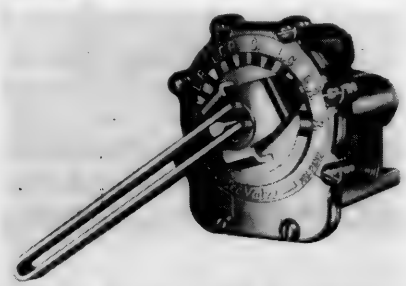
Easily removable side panels, twin circuited evaporator coils, and collection of condensate with disposal over the condenser coil are features of the 4-hp unit. Decorative grilles are added when used in transoms or through the wall. Unit is designed for installation with the prefabricated ducts.

Duct kit consists of glass-fiber insulated, aluminum pieces. Six 10 x 14-in., 4-ft sections comprise the main duct. Eight 8 x 8-in., 4-ft sections are branches. Return air duct, filter, diffusers, and tape are included.

More information? Circle Item 63 on postcard, page 97.

Four-Way Selector Valve

A four-way selector valve for accurate control of liquid flow to multiple spray manifolds or feed lines is introduced by Spraying Systems Co., Bellwood, Ill. Three outlet connections are provided and liquid flow through any one or any combination of these outlets is obtained



by a setting of the control lever. Selection of setting is made with the valve in *off* position. Positions are indexed for automatic exact positioning of control lever, and valve is opened merely by raising lever handle. If use of less than three outlets is desired, adjustment is made by capping unused valve outlets.

The unit is identified as the TeeValve and is supplied in choice of ¼-, ⅜-, and ½-in. NPT outlet connections. Also provided are connections for pressure gage, and by-pass and pressure relief valve assembly.

More information? Circle Item 64 on postcard, page 97.

Interchangeable Furnace Blower

A furnace blower that is completely interchangeable and may therefore be substituted immediately without testing is being introduced by Viking Air Products, Division National-U. S. Radiator Corp., Cleveland, Ohio.

The interchangeable B blower has been accepted by UL and AGA as identical in both dimensions and per-

formance with other blowers of the same series now purchased or assembled by manufacturers. This interchangeability permits manufacturers with currently approved models to apply for and receive UL and AGA approval of the similar B series without testing.

The blower also features many mechanical advantages, chief of which is the new Mark III bearing. Precision-ground mated journals support the shaft in the bearing, enlarging its diameter so that the same load is distributed over a larger area. This lighter loading offers a bearing which measures up to modern requirements for longer blower operation at higher speeds.

More information? Circle Item 65 on postcard, page 97.

Cooling-Water Treatment

For corrective and preventative maintenance of water cooling systems, Sealed Unit Parts Co., Inc., New York, N. Y., has introduced Phyta-77, a liquid compound that deletes the oxygen content from water, thereby eliminating most of the causes of corrosion.

Though harmless to the human skin, the company states, the compound is toxic to algae and other biological fouling organisms. It is equally applicable for any type of water.

When added to a water system, compound penetrates scale and holds it in colloidal suspension. When used as a preventive, no bleed-off is necessary.

More information? Circle Item 66 on postcard, page 97.

(*Concluded on page* 124)

New Revolutionary Steam Trap

One large capacity seat for all pressures!

New Sarco Thermodynamic steam trap. Sizes ⅜ to 1"...each body as small as a tee fitting! Capacity is determined, not by a bulky body, but by the effective orifice, valve action, pressure drop and condensate temperature.

1. Cuts trap inventory

With the revolutionary Sarco TD steam trap, you use exactly the same trap...with exactly the same large capacity seat...for all pressures 10-600 psi...for heavy, light or no condensate load. Sizes ⅜ to 1".

2. All pressures 10 to even 600 psi!

...without changes or adjustments. Self-adjusting. High pressure construction...at a low pressure trap price!

3. Operates perfectly when pressure fluctuates

Absolutely no effect even from 600 to 10 psi! No water seal to evaporate. No adjustments.

4. Widest capacity range

Same large capacity seat for 10 as for 600 psi. Pressures of incoming air and condensate INSTANTLY AND FULLY raises valve head (disc), permitting maximum discharge.

5. Operates equally well on all loads

The same Sarco TD trap for heavy, light or no condensate load. No prime to lose. No adjustments.

6. No oversizing worries

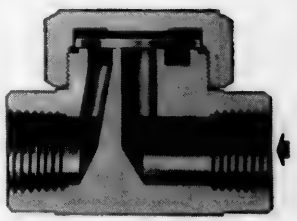
You can size the new Sarco TD steam trap for peak condensate loads...without risk of blowing steam on light loads... no prime to lose...no adjustments.

7. No steam leak required

...to operate the revolutionary Sarco TD steam trap (Pat. Pending). Closes tight against steam!

Convince yourself by 60-day trial...use coupon

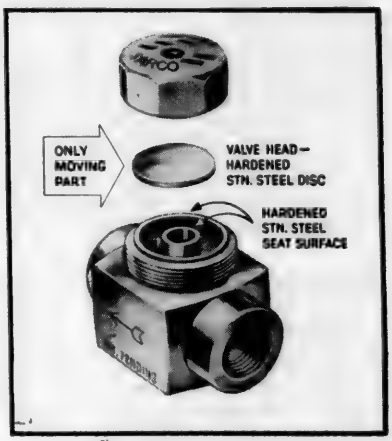
SARCO



Trouble-free design

Here is a trap so simple, it doesn't even have a valve closing mechanism. The kinetic energy of steam closes the valve. ONLY the new Sarco TD uses this operating principle.

No mechanism parts to wear or stick. No narrow channels to choke. No gaskets to leak.



Maintenance practically eliminated

The all-stainless steel Sarco TD has only 3 parts...cap, disc and body. Only moving part is a hardened SOLID stainless steel disc, practically wear-proof.

SARCO COMPANY, INC.
Empire State Bldg., N. Y. 1, N. Y.

Please send me Sarco TD Steam Trap and strainer for 60-day trial.
Size_____ For use on_____

Name_____

Firm_____

Address_____

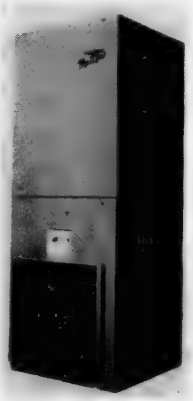
City_____ State_____

2181-B

(*Concluded from page* 122)

Heat Pumps to 40 Tons

An economy model heat pump, called Prop-R-Temp, which the company says can be installed for as low as 1,000 dollars, is announced by Typhoon Heat Pump Co., Div. of Hupp Corp., Tampa, Fla. The line includes year-round water-to-air, air-to-air, and water-to-water heating and cooling models in sizes up to 40 tons.



Admiralty metal condensers and all-copper cooling and heating coils are standard equipment. The company estimates that a 1,000-sq ft house in the North or South can be heated and cooled for as low as ten dollars a month with its water-to-air equipment.

Water-to-air models are available in sizes 2½ to 12 tons full hermetic, and 10 to 30 tons semi-hermetic. On full hermetic models the complete refrigeration chassis can be exchanged on the job in 30 min., and carries a 5-yr factory warranty.

Air-to-air models are available in 3 and 5-hp models, now in production. Custom-built air source heat pumps up to 20 hp are currently available, designed and manufactured to customers' specifications.

Water-to-water models, producing warm and chilled water, are available in sizes 2½ to 40 tons.

More information? Circle Item 67 on postcard, page 97.

Boiler Cleaning Accessory

Drum-Seal, an accessory that fits over any container or drum normally used to hold waste or trash in the boiler room or basement is announced by Kent Co., Inc., Rome, N. Y. It is designed to hold the company's vacuum head which provides the suction.

Combination makes it unnecessary to use regular vacuum for unusually dirty jobs or foul up regular cleaner. Head provides suction, and any sturdy drum or container serves as a dirt receptacle. The larger the container used, the less frequently it will need to be emptied.

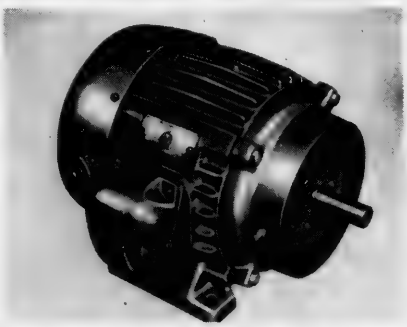
It is especially suitable for wet pick-up jobs where capacity of the average vacuum cleaner would be inadequate for the amount of water to be picked up.

Suction created by head draws accessory tightly over the open top of the receptacle. Dirt can't leak out to float around in the air or spill on the floor.

More information? Circle Item 68 on postcard, page 97.

Direct Mounting, Enclosed Motor

A totally-enclosed motor with facilities for mounting the driven equipment directly to the motor has been developed by U. S. Electrical Motors Inc., Los Angeles, Calif. Accurate alignment is provided by means of NEMA style C bracket with tapped holes for bolting from the driven equipment side. Designed to the new



dimension standard of NEMA, the motor has more horsepower in less space. Designated Type J, the motor is available in ratings of 1 to 30 hp.

Shock resistant, cast-iron frame is heavily ribbed for strength and rapid heat dissipation. A guarded fan propels air over the ribs of the frame which ensures maximum cooling as well as self-cleaning characteristics. A brass slinger prevents moisture from entering at the take-off shaft. Castings are normalized to prevent misalignment of bearings.

More information? Circle Item 69 on postcard, page 97.

Compact Central Conditioner

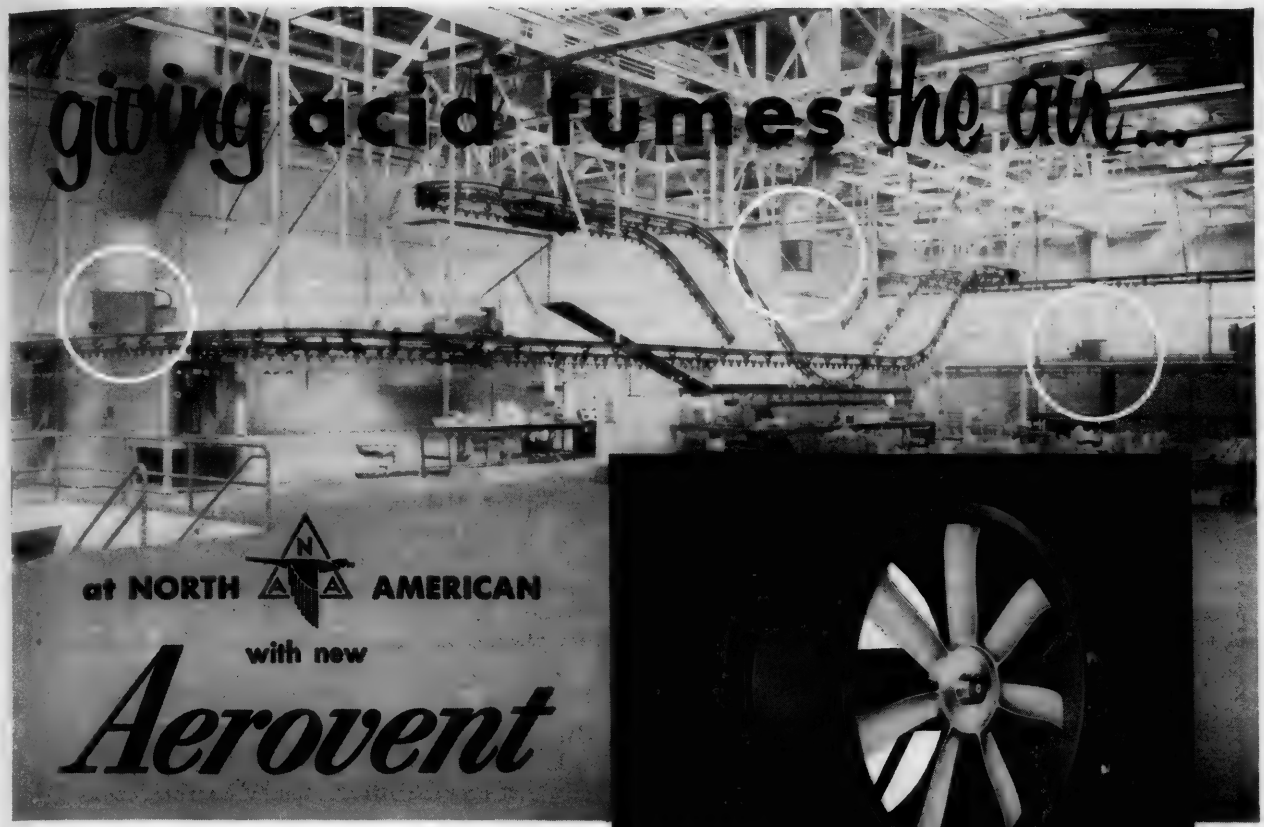
Delivering 60,000 Btu under ASRE conditions, a compact, Rheemaire central air conditioner is announced by Rheem Mfg. Co., Chicago, Ill., whose 5-ton condenser unit is only 31 in. high. It has a 3-hp compressor.

Cooling is effected in the home by cooling coils in the plenum of a furnace or through a supplementary unit containing horizontal flow coil and blower and filters. Condenser unit has been developed to meet the demand for summer comfort in larger and more expensive homes.

Installed in retail establishments, conditioner will provide cool, clean air from ceiling-mounted units containing evaporator coil, blower, and filters. The condensing unit will be mounted on the roof of single story buildings, immediately above the ceiling-mounted unit. In multi-story buildings, the condensing unit can be mounted on brackets attached to the rear wall of the building.

The condenser is made entirely of copper, to make use of the heat transfer efficiency of copper. Cooling efficiency is further enhanced by covering the entire condenser surface with a very thin water film. Operation of the unit at highest summer temperatures uses less water per day than would be required by any one member of a family, the company says.

More information? Circle Item 70 on postcard, page 97.



"SP-7" 7-blade semi-pressure DUCT FANS!

Suitable for high temperatures and corrosive atmospheres, "SP-7" Belt-Driven Duct Fans are available in 14" to 60" diameters.

Installed at the Columbus, Ohio plant of North American Aviation, Inc., these new Aerovent "SP-7" Belt-Driven Duct Fans, with 7-blade "Macheta" Airfoil Propellers, are used to exhaust acrid fumes and steam vapors from a spray-type processing machine. At temperatures of 180° to 200° F., the solution flashes into steam and noxious fumes which would contaminate the entire area if unabated. Located above each end of the spray section, and at intermediate points, the fans induce a steady flow of air through the unit to trap and remove heavy vapors at the source.

Recommended for resistances in the ¾" to 2½" S.P. range, these units, designed for all standard duct systems, move *more air* with less horsepower; provide greater mechanical efficiency with lower initial and operating costs. Also available in Direct-Connected, Extended Shaft, Direct Driven Duct and Divided-Duct types, all "SP-7" Fans may be ordered with special-duty motors, alloy propellers and special protective coatings for extreme temperature, moisture and corrosive conditions.

WRITE FOR FREE BULLETIN NO. 400

REMOVES DUSTS, VAPORS, FUMES

Contaminated atmospheres are exhausted safely, efficiently with "sp-7" Belt-Driven Duct Fans! Complete assembly, except motor, mounts inside duct system. Adjustable motor base for correct belt tension. Air-insulated belt housing for adequate cooling, prolongs belt and bearing life.

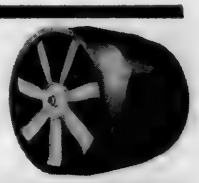
All "SP-7" Fans are rated in accordance with the Standard Test Code and conform with U.S.D.C. Comm. Std. CS178-51.

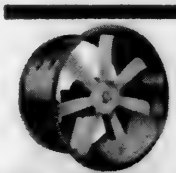
"EFFICIENCY-ENGINEERED" air-moving equipment

"SP-7" FANS FOR ALL INDUSTRIAL REQUIREMENTS

DIRECT CONNECTED
Steel ring or square panel for wall, ceiling or penthouse. 14" to 60". Used with extended shaft for heat, moisture and corrosion.

"BI-FLO" DUCT
New divided-duct design, for air-supply or exhaust. Motor located out of airstream. Also serves as stack booster. Sizes 18" to 48".





DIRECT-DRIVEN DUCT
For installations which permit connection of complete fan assembly within airstream. For vertical or horizontal use. Sizes 14" to 60".

Aerovent

Aerovent FAN COMPANY, INC.

Ash and Brandt Sts. Piqua, Ohio

BOOK REVIEWS

Publications abstracted in this department should be ordered direct from publisher.

FOUNDATIONS

All phases of foundation work are covered by Ellwyn E. Seelye, senior partner of Seelye, Stevenson Value & Knecht, consulting engineers, in his book Foundations Design and Practice.

Starting with some of the elementary information on foundations, the author then moves on to do's and don'ts of successful foundation design and practice.

The book covers such subjects as waterproofing, underpinning, industrial floors on ground, foundations for pavements; foundations for bridge abutments, economics of design, design tables for reinforced concrete footings, retaining walls, steel pipe piles, dam foundations, pipe and sewer foundations, applied soil mechanics, standard specifications, frost data and permafrost, small house foundations, building code practice, earthquake design, and structural design data.

It also has information on the cathodic protection for steel structures in salt water.

Foundation Design and Practice, by E. E. Seelye. Cloth bound, 8 x 10 in. Published by John Wiley & Sons, Inc., 440 4th Ave., New York 16, N. Y. Price, $16.

NDHA PROCEEDINGS

The 1955 official proceedings of the National District Heating Association contain the papers and committee reports presented at the 46th annual meeting of the society that was held at the Edgewater Beach Hotel, Chicago, Ill., May 23 to 26, 1955. It also contains a list of members, the president's annual address, and the report of the secretary-treasurer.

1955 Proceedings of the National District Heating Association. Cloth bound, 239 pages. Published by the society, 827 N. Euclid Ave., Pittsburgh 6, Pa. Price, $10.

THE MODERN CHURCH

Engineers and architects interested in the design and construction of churches, will find much of value in The Modern Church, by Edward D. Mills, a practicing architect. A large number of illustrations is included.

The text covers the church and the community, planning considerations, acoustics, practical considerations, materials, furnishings and religious art, building costs. Three appendixes are included covering planning and related information.

The Modern Church, by E. D. Mills. Cloth bound, 7 x 9 inches, 189 pages. Published by Frederick A. Praeger, Inc., 150 E. 52nd St., New York 22, N. Y. Price, $9.75.

• • •

SINGLE PORT GAS BURNERS—Research Bulletin 72 of the AGA Laboratories presents a Study of Single Port Gas Burners. This investigation covers studies of the effects of design and application on lifting, yellow tipping, flashback, primary air injection characteristics, and noise of extinction of single port burners. American Gas Association, 420 Lexington Ave., New York 17, N. Y. Price of report, $2.

WARM AIR HEATING—Standard No. 90B covering Residence Type Warm Air Heating and Air Conditioning Systems, has been issued by the National Fire Protection Association. These standards, which supersede those of 1956, apply to residential type central systems. National Fire Protection Association, 60 Batterymarch St., Boston 10, Mass. Price, 35 cents.

ASRE STANDARDS—Three new standards have been made available by the American Society of Refrigerating Engineers. ASRE Standard 29-56 on Methods of Rating and Testing Ice Makers, price 75 cents; Standard 35A-56, Method of Testing Dessicants for Refrigerant Drying, price 75 cents; Standard 35B-56, Methods of Rating and Testing High Side Liquid Line Driers, for use with Refrigerant 12 or 22, price $1. The American Society of Refrigerating Engineers, 234 5th Ave., New York 1, N. Y.

AIHA HYGIENIC GUIDES—Recent additions have been made to the series of Hygienic Guides by the American Industrial Hygiene Association. Each sheet treats a different material. The new sheets are on carbon disulfide, ethylene dichloride, hydrazine, methylene dichloride, and nickel carbonyl. They have information on potential hazards, maximum allowable concentration and engineering control. American Industrial Hygiene Association, 14125 Prevost, Detroit 27, Mich. Price, 25 cents each.

CORROSION OF GAS-FIRED DOMESTIC WATER HEATERS—Results of a study conducted at the Case Institute of Technology under the sponsorship of the American Gas Association are presented in a report on Effect of Certain Variables on Corrosion of Gas-fired Domestic Water Heaters. It contains detailed information and photographs showing corrosion found in the tanks under test for variable conditions. American Gas Association, 420 Lexington Ave., New York 17, N. Y. Price, $1.

BIBLIOGRAPHY ON COOLING TOWERS—Texas Engineering Experiment Station has issued an Engineer's Bibliography on the Design and Operation of Cooling Towers. It covers cooling towers and related subject matter, and is listed as Bulletin 138. Texas Engineering Experiment Station, College Station, Tex.

ZINC-COATED IRON AND STEEL PRODUCTS—ASTM Committee A-5 on Corrosion of Iron and Steel has sponsored ASTM standards on zinc-coated iron and steel products. This covers zinc-coated sheets, hardware, wire, strands, fencing, pipe, and terne-alloy-coated sheets. It contains 21 specifications of which four are new or recently revised. American Society for Testing Materials, 1916 Race St., Philadelphia, Pa. Price, $2.25.

Readily Available Westinghouse Fans

Meet your Fume and Dust Removal Requirements

Whatever your air handling problem . . . smoke, fumes, vapor, dust, wood shavings, granular material or ventilating . . . these Westinghouse fans are designed to handle or remove them . . . efficiently and economically.

INDUSTRIAL FANS (Steel Casing) . . . high efficiency for general Air Handling; fume and dust removal; 11 sizes, each with 3 types of wheel for specific applications. Wheel diameters 19″ to 64″; inlet diameters 11″ to 37″.

INDUSTRIAL FANS (Cast Iron Casing) . . . ruggedly built, corrosion resisting. For low volume fume or dust removal, materials conveying, industrial drying and cooling. In 10 sizes, each with 3 types of wheel for specific applications. Wheel diameters 8″ to 34″; inlet diameters 4½″ to 18″.

VENTILATING SETS (Direct-Connected) . . . compact, efficient, ready-to-run. Especially suited for small ventilating installations. Cleanable radial blade wheel minimizes problem of handling airborne dirt and grease. Six sizes. Wheel diameters 6″ to 15″; inlet diameters 6″ to 14″.

VENTILATING SETS (V-belt driven) . . . self-contained. Install indoors or outdoors in a wide variety of heating, ventilating or air conditioning applications. Twelve sizes. Wheel diameters 9″ to 30″; inlet diameters 10″ to 32⅞″.

These leading industrial distributors stock Westinghouse Ventilating Sets and Industrial Fans

FORSLUND PUMP AND MACHINERY CORP.
Kansas City, Missouri
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MILLS & LUPTON SUPPLY CO.
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Phone: Alpine 2-4121

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Phone: Amherst 9-5631

Mobile, Alabama
Phone: Hemlock 3-7411

CAREY MACHINERY & SUPPLY CO.
Baltimore 13, Maryland
Phone: Broadway 6-1600

MILL & INDUSTRIAL SUPPLY
Louisville, Kentucky
Phone: Clay 3643

If there isn't one near you, call your Sturtevant Sales Engineer, or write Westinghouse Electric Corporation, Sturtevant Division, Hyde Park, Boston 36, Mass.

WESTINGHOUSE AIR HANDLING

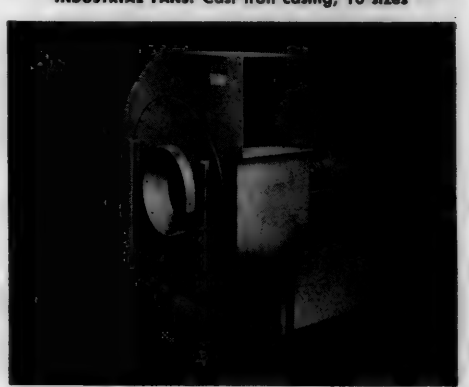
J-80619

YOU CAN BE SURE...IF IT'S Westinghouse

VENT SETS: Direct-connected, 6 sizes

VENT SETS: V-belt driven, 12 sizes

INDUSTRIAL FANS: Cast iron casing, 10 sizes



INDUSTRIAL FANS: High-efficiency steel casing, 11 sizes

NEWS OF THE MONTH

GOVERNMENT-INDUSTRY

air conditioning conferences will seek ways to pool resources. Scheduled for April.

A Government-industry symposium on general air-conditioning applications is tentatively scheduled for April 3, 4, and 5 in the Commerce Department Auditorium, Washington, D. C.

The symposium was proposed by the Commercial and Industrial Air-Conditioning Manufacturers Industry Advisory Committee, set up under the Business and Defense Services Administration of the Commerce Department, and will be held with cooperation of officials of BDSA.

• **EXPLORE POSSIBILITIES**— Objective of the discussions, in which air-conditioning industry spokesmen and Government officials from both civilian and defense agencies will participate, is to recognize the modern necessity of air-conditioning, and, through the pooling of knowledge of Government and the industry, to develop a better understanding of what air-conditioning can accomplish for Government, industry, and domestic users, and to obtain the maximum benefit from manpower and money spent on air-conditioning.

Invitations to attend the conference will be issued to Government participants by the Government agencies involved, including General Services Administration, the Defense Department and the three armed services, and a number of other agencies, and will be sent out to air-conditioning industry participants by industry representatives on the Advisory Committee.

AIR CONDITIONED SIDEWALK

North Towne shopping center, San Antonio, Texas, is the nation's first shopping center to install an air-conditioned sidewalk. Three 7½-hp Weathermakers, installed by Carrier Corp., Syracuse, N. Y., are concealed in the double closet in the center of the picture, providing cooling in summer and heating in winter.

AEC COMMISSIONER

proposes resident engineers and scientists as part-time high school science teachers to ease shortage

"School principals and boards of education, faced with the problem of offering the essential sciences in their curricula might invite resident scientists and engineers in their communities to assist in the technical instruction on a part-time basis," proposed Dr. Willard F. Libby, Commissioner, U. S. Atomic Energy Commission.

Speaking before the National Capital Area Section, American Society for Engineering Education, Washington, D. C., Dr. Libby stressed the urgent need to educate engineers and scientists in order that the development of atomic uses, peaceful and military, may proceed.

Why is the field of basic science failing to attract enough qualified students? Dr. Libby continued:

• **SALARIES LOW**—"Perhaps the first in the causes for our difficulties is the rather unsatisfactory salaries which are paid men of real competence in the sciences. . . . Students who have to make their way and have debts to pay think that the ceilings to their salaries are likely to be lower than if they chose some other profession. . . . It is particularly important for the less gifted . . . who realize that they will never be leaders in the field."

The second most important factor in the decreased enrollment in the basic sciences is the "quantity and quality of instruction in the secondary schools. . . . The teachers . . . are doing as good a job as their predecessors did but there are relatively fewer of them.

"Lawyers and doctors have for many years been accustomed to assisting in instruction in their specialties in the colleges of the country. The bases for such part-time teaching have been well set in practice and seem to be generally acceptable."

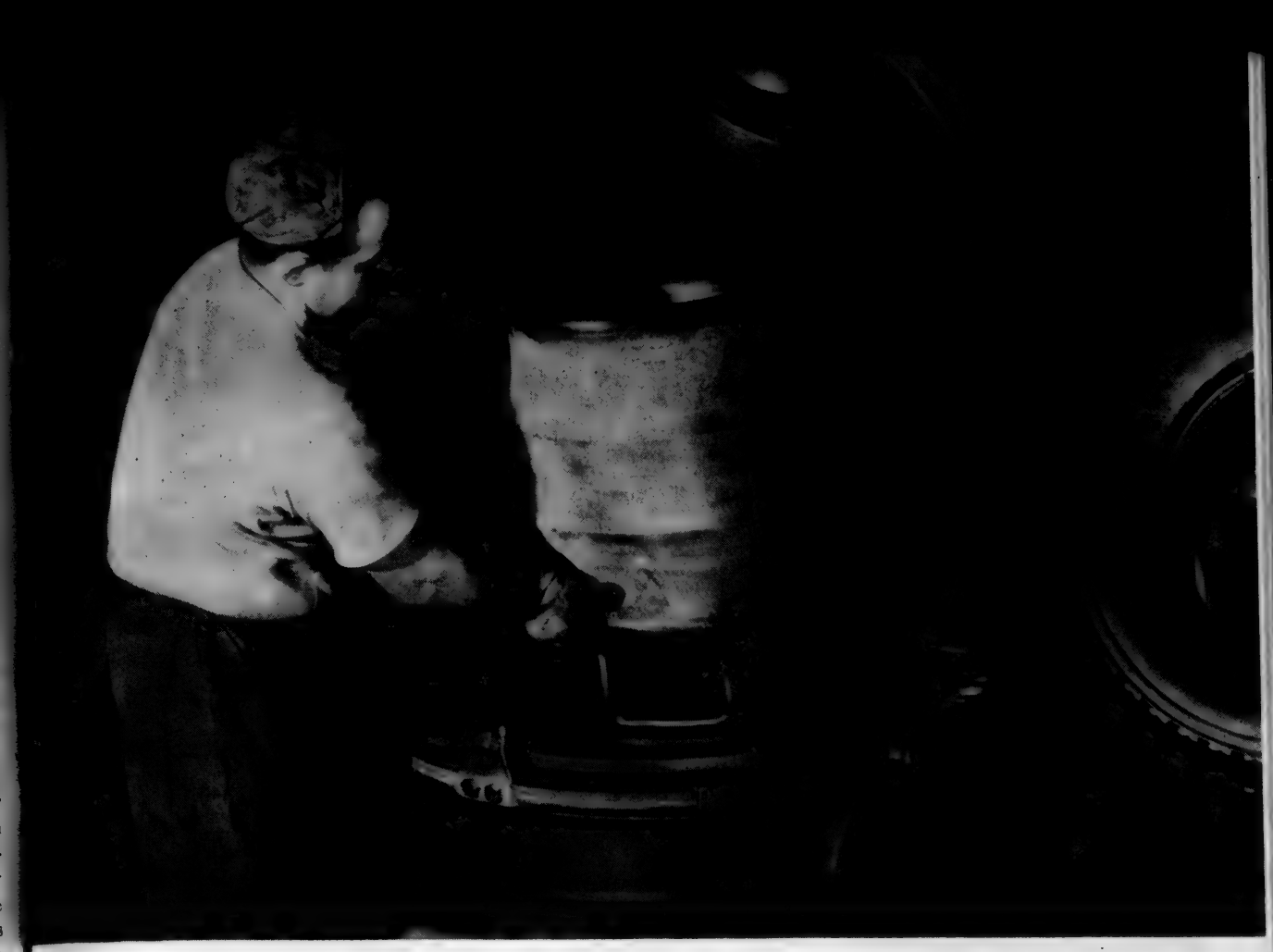
• **ENGINEER CAN HELP**—After proposing that practicing technical personnel help out as teachers, Dr. Libby continued:

"Certainly such arrangements could fill a temporary shortage and might be found to be a more or less permanent solution, for it does not seem likely that high school teachers' salaries are likely to become in any way competitive with those elsewhere available to trained scientists and engineers. . . . It appears to be desirable that direct contact with practicing technical people might help reverse the present discouraging trends."

The quality of instruction in the colleges and universities, especially the beginning courses in physics and chemistry, must be the best, Dr. Libby said. The better members of the college staff should teach them.

• **AEC PROGRAM**—Graduate school training at Oak Ridge, Tenn., and at Argonne National Laboratory is among the measures adopted by AEC to alleviate the

(*Continued on page* 146)



Dunlop Cuts Steam Cost 23½% Per Tire

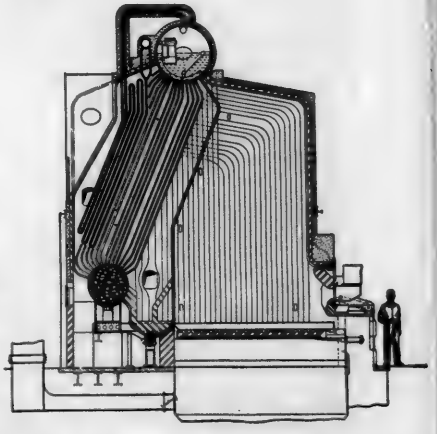
New B&W FP Boilers Burn Less Coal ...Supply Higher Temperature Steam

At Dunlop Tire & Rubber Company's Buffalo Plant, these big, modern curing presses are stepping up tire production. But they need plenty of dependable steam at fairly high temperature. The boilers they had couldn't do the job so they installed two new B&W Integral-Furnace Boilers.

These new boilers not only supply that "increased production" steam, but burn less coal and generate more steam than the old boilers, using the same limited space—a combination that cuts steam cost per tire 23½%.

Dunlop installed its first six B&W units in 1920, when the Buffalo Plant was new. Although still capable of reliable service after 37 years, the higher steam temperature demand of modern tire making has marked the four remaining old boilers for early replacement by more efficient B&W FPs.

Dunlop's experience with B&W boilers is typical of thousands of industrial, utility, commercial and institutional users. So if you use steam for power, processing or heating . . . if you want to modernize or expand your plant . . . if you have a steam plant problem of space or fuel or fly ash . . . call B&W and get the benefit of 90 years of steam experience. The Babcock & Wilcox Company, Boiler Division, 161 East 42nd Street, New York 17, N. Y.



Each B&W FP unit can supply 40,000 lb of steam per hr at a pressure of 260 psi and temperature of 505 F. New boilers were specially designed to fit space used by old units they replaced. Zack C. Hinds, Buffalo, New York, was the Consulting Engineer on the project.

G-801-1B

BABCOCK & WILCOX

BOILER DIVISION

NEW CATALOGS

Use the prepaid postcard on page 97 for securing your copies of catalogs described in this department.

NON-FREEZE STEAM COILS—Halstead & Mitchell, Pittsburgh, Pa., announces Bulletin S-200 which describes in detail the company's new line of standard and non-freeze steam coils, said to be especially suitable for central heating and similar systems. The catalog describes the construction of the coils, including tubing, casings, headers, refrigerant distribution, return bends, and valves. Test and dehydration as well as means of specifying special coils are also described. Tables are devoted to dimensional data, male pipe connections, and air friction through coils. A section is devoted to methods of calculating proper sizes of steam coils, and in conjunction with this the bulletin presents tables showing final temperature and condensation rates as well as constants for temperature rise.

Circle **Item 71** on Inquiry Card

AIR HAMMER—Full information about the Ramex Air Hammer, model AR-4, featuring precision impact control is contained in a new 4-page catalog available from E. V. Nielsen, Inc., Stamford, Conn. Specifications for this 4½-lb device capable of 5400 blows per minute as well as specific applications are noted. More than 40 different tools and accessories are available for use with the air hammer. The catalog includes drawings and specific size data about each of these tools and accessories which can be used with the air hammer.

Circle **Item 72** on Inquiry Card

ULTRASONIC GENERATORS — High power ultrasonic generators and transducers adaptable to practically any type of tank configuration and dimension are described in the new Bulletin DR-2000 published by Acoustica Associates, Inc., Glenwood Landing, L. I., N. Y. The bulletin provides details of how two generators, Model DR-2000AL (low frequency) and Model DR-2000AH (high frequency), can be applied for powering large scale, high volume batch or automated ultrasonic cleaning, machining and liquid processing systems.

Circle **Item 73** on Inquiry Card

HUMID AIR COIL UNITS — Catalog 3C6A on humid air coil units for applications above 34 deg F is available from Refrigeration Engineering, Inc., Los Angeles, Calif. It features performance of a steam or hot water reheat coil which may be added to the face of this unit for use in banana room applications. Dimensions and specifications are listed for Freon, direct expansion ammonia, flooded ammonia and brine applications.

Circle **Item 74** on Inquiry Card

PIPE MATERIAL SPECIFICATIONS—Ferrous and non-ferrous pipe material specifications are published by the research staff of Tube Turns, Div. of National Cylinder Gas Co., Louisville 1, Ky. Paper 2.02 brings material published seven years ago up to date. Included are API and ASTM specifications.

Circle **Item 75** on Inquiry Card

IMMERSION ELECTRIC WATER HEATER — Flange type electric immersion heaters for use in domestic water heaters and other appliance and industrial applications are the subject of four-page illustrated Bulletin No. HV offered by Heatube Corporation, Allegan, Mich. The bulletin is specifically directed to manufacturers of tank type domestic water heaters and to repair shops, listing 79 makes in which these heaters are suitable replacements.

Circle **Item 76** on Inquiry Card

AUTOMATIC CONTROLS—Catalog No. 857, issued by The Mercoid Corporation, Chicago, Ill., presents the company's line of automatic controls for heating, air conditioning, refrigeration and industrial applications. The controls feature hermetically sealed mercury contacts. Each control is accompanied with description, specifications and engineering data. The majority of controls listed for industrial applications are available with various style cases for outdoor, indoor or hazardous locations.

Circle **Item 77** on Inquiry Card

DRY TYPE RENEWABLE AIR FILTERS—Bulletin 237, published by American Air Filter Co., Inc., Louisville, Ky., contains completely illustrated procedure for loading and unloading its Multi-Pak dry type renewable media high efficiency air filter. Engineering and installation data are presented.

Circle **Item 78** on Inquiry Card

AIR COMPRESSORS—A data sheet listing construction details, specifications, and models of air compressors in the ¼-20 hp range is issued by Brunner Mfg. Co., Utica, N. Y. Bulletin 653R provides data useful in selecting the right compressor for a specific job in virtually every industry. Air compressors, single and two stage, are available either for electric motor or gasoline engine drive. Simple compressors, single or two stage are also available with or without flywheel. Air outfits for continuous operation as used in paint spraying or laundry machinery are described.

Circle **Item 79** on Inquiry Card

VALVE SELECTION—A revised edition of its guide for selecting valves, boiler mountings, and lubricating devices, Circular No. 555, is published by the Lunkenheimer Co., Cincinnati, Ohio. New sections have been added to the 24 pages of tables, technical data and information.

Circle **Item 80** on Inquiry Card

(*Continued on page* 132)

G-B SNAP-ON DISTRIBUTORS

(See ad on facing page)

ALBUQUERQUE, Mt. States Insulation Co.
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APPLETON, J. D. Wilson Co.
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CINCINNATI, R. E. Kramig & Co.
CLEVELAND, The Miles Materials Co.
COLUMBUS, Santeler Brothers
DALLAS, Insulation Supply Co., Inc.
DAVENPORT, Republic Electric Co.
DENVER, Gene Wright Lumber Co.
DETROIT, Coon-DeVisser Co.
EL PASO, Insulation & Specialties Co.
FARGO, N. D., Smith, Inc.
FT. SMITH, Ark., Gunn Distributing Co.
FT. WAYNE, Ind., M. H. Hilt, Inc.
FT. WORTH, The Bracken Co.
GREENSBORO, N. C., Starr Davis Co., Inc.
GULFPORT, Miss., Paine Supply Co.
HOUSTON, Precision Insulation Co.
INDIANAPOLIS, Central Supply Co.
IRON MOUNTAIN, Mich., Champion, Inc.
JACKSON, Miss., Paine Refrigeration Supply Co.
JOPLIN, Mo., Joplin Cement Co.
KANSAS CITY, Kelley Asbestos Co.
LITTLE ROCK, Gunn Distributing Co.
LOS ANGELES, Western Fibrous Glass Products
Thorpe Insulation Co.
LOUISVILLE, General Insulation & Roofing Co.
MADISON, Wis., J. D. Wilson Co.
MEMPHIS, John A. Denie's Sons Co.
MIAMI, Southern States Iron Roofing Co.
MILWAUKEE, J. D. Wilson Co.
MINNEAPOLIS, Asbestos Products, Inc.
MOBILE, Ala., Shook & Fletcher
NASHVILLE, Southern States Iron Roofing Co.
NEWARK, N. J., Eastern Steam Specialty Co.
NEW HAVEN, Conn., Insulation Supply Co.
NEW ORLEANS, Eagle Asbestos & Packing
NEW YORK, Eastern Steam Specialty Co.
OKLAHOMA CITY, Ball Distributing & Engineering Co.
OMAHA, Cardinal Supply & Mfg. Co.
PHILADELPHIA, John F. Scanlan, Inc.
PITTSBURGH, Dravo Corp., Keystone Division
PHOENIX, Ariz., Kircher Asbestos & Rubber Co.
RALEIGH, N. C., Southern States Iron Roofing Co.
RICHMOND, Va., Southern States Iron Roofing Co.
ROCKFORD, Ill., Mott Brothers Co.
SALT LAKE CITY, Bullough Asbestos Supply Co.
SAN ANTONIO, The Bracken Co.
SAN DIEGO, Western Fibrous Glass Products
SAN FRANCISCO, Western Fibrous Glass Products
SAVANNAH, Ga., Southern States Iron Roofing Co.
SEATTLE, Western Fibrous Glass Products
ST. LOUIS, A. G. Brauer Supply Co.
ST. PAUL, Asbestos Products, Inc.
SYRACUSE, N. Y., Industrial Supply Co.
TAMPA, Fla., Eagle Roofing & Art Metal Works, Inc.
TALLAHASSEE, Fla., Capital Refrigeration & Supply
TULSA, Okla., Ball Distributing & Engr. Co.
TUPELO, Miss., Paine Supply Co.
WASHINGTON, Walter E. Campbell Co., Inc.
WICHITA, Jamar-Olmen Construction Co.
VANCOUVER, B. C., Fleck Brothers Limited

GUSTIN gb BACON

SNAP*ON..new way to insulate high velocity ducts in a hurry

Snap*On, originally designed as a one-piece pipe insulation molded of fine glass fibers, is also a "natural" for high velocity ducts. With Snap*On, you can insulate 6 ft. of duct in one easy spread-and-snap motion.

Wall thickness and heat savings are uniform because this unique insulation is molded to *uniform* thickness and won't lose thickness during application. Thermally, you get the most efficient duct insulating material on the market today. In exposed areas where appearance is important, the uniform thickness of Snap*On insures a smooth even surface for canvas or vapor barrier finishes.

For heating ducts, Snap*On comes in 3 ft. sections with canvas jacket or in 6 ft. sections, plain. For dual temperature or cooling ducts, Snap*On comes in 3 ft. sections with factory applied vapor barrier jacket. Both are available in sizes up to 33 in. I. D.

For complete information and prompt delivery, call your local Snap*On distributor listed in adjoining column.

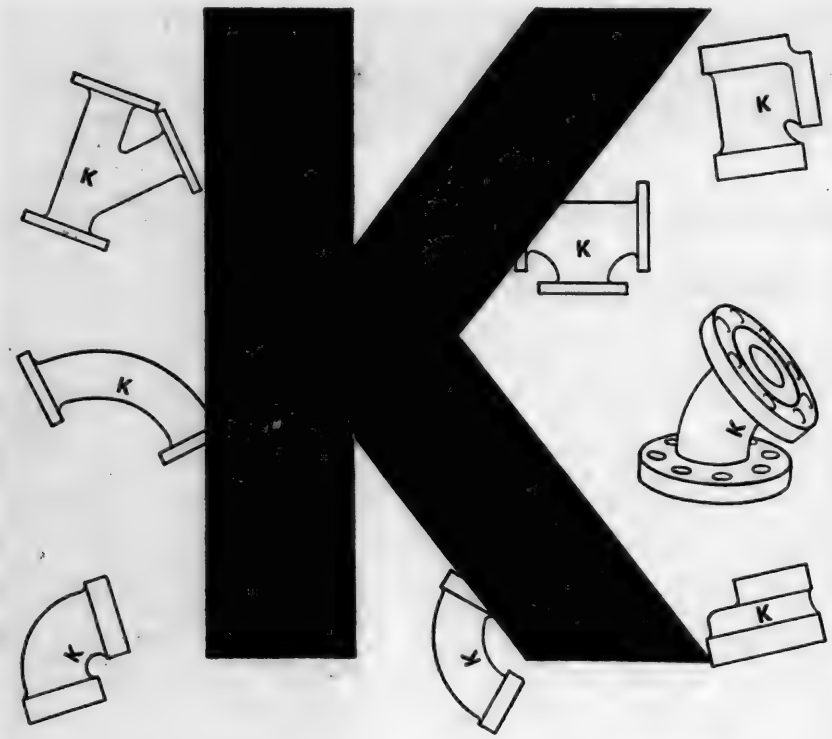
*Trademark Reg.

GUSTIN-BACON Mfg. Co. GUSTIN gb BACON

Thermal and acoustical glass fiber insulations • Pipe couplings and fittings
Molded glass fiber pipe insulation

222 W. 10TH ST., KANSAS CITY, MO.

See Adjoining Column for Local Snap*On Distributor



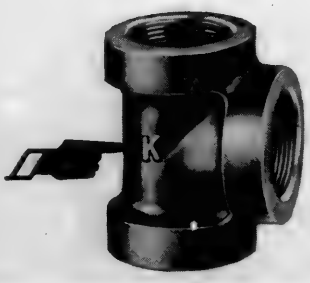
YOUR INITIAL GUARANTEE . . .

. . . *for better pipe fittings*

It's a good policy to standardize on precision-built "K" cast-iron pipe fittings. Accurately machined with clean, sharp threads and chamfered entrances, "K" screwed fittings are made to save you time on every job.

Close metallurgical control of each "K" fitting guarantees extra tensile strength and freedom from porosity, impurities and trouble-causing defects. "K" fittings are built to last, to seal tightly and to join quickly. You don't have to "baby" a "K" fitting.

Specify "K" pipe fittings from your supplier. There are over 3000 sizes and shapes . . . a type for every requirement. Write for our condensed catalog.



THE KUHNS BROTHERS CO.
1800 McCALL STREET • DAYTON 1, O.
Making fittings since 1887

NEW CATALOGS

(*Continued from page* 130)

Use the prepaid postcard on page 97 for securing your copies of catalogs described in this department.

NEW VENTILATING LINE—Complete details of all its equipment now available is contained in a 20-page brochure published by newly-formed Power Line Fan Co., Div. of Chelsea Products, Inc., Plainfield, N. J. Line includes dome type roof and wall ventilators, penthouse units, air blasters and man coolers, as well as tube-axial general and pressure duty exhaust fans.

Circle **Item 81** on Inquiry Card

CENTRIFUGAL FANS — A 60-page, illustrated brochure is released by the Chicago Blower Corp., Franklin Park, Ill., listing its latest line of backward curved blade centrifugal fans. The booklet features performance charts on the new fans which are designed for a wide range of commercial and industrial ventilating, air conditioning and heating applications.

Circle **Item 82** on Inquiry Card

FORGED STEEL VALVES—The complete line of forged steel gate and needle valves, specifically designed for the petrochemical power and process industries, is graphically described in 12-page Bulletin DH-80, issued by R-P&C Valve Div., American Chain & Cable Co., Inc., Reading, Pa. Material specifications, pressure - temperature ratings, working pressures, dimensions, and applications of the units are covered.

Circle **Item 83** on Inquiry Card

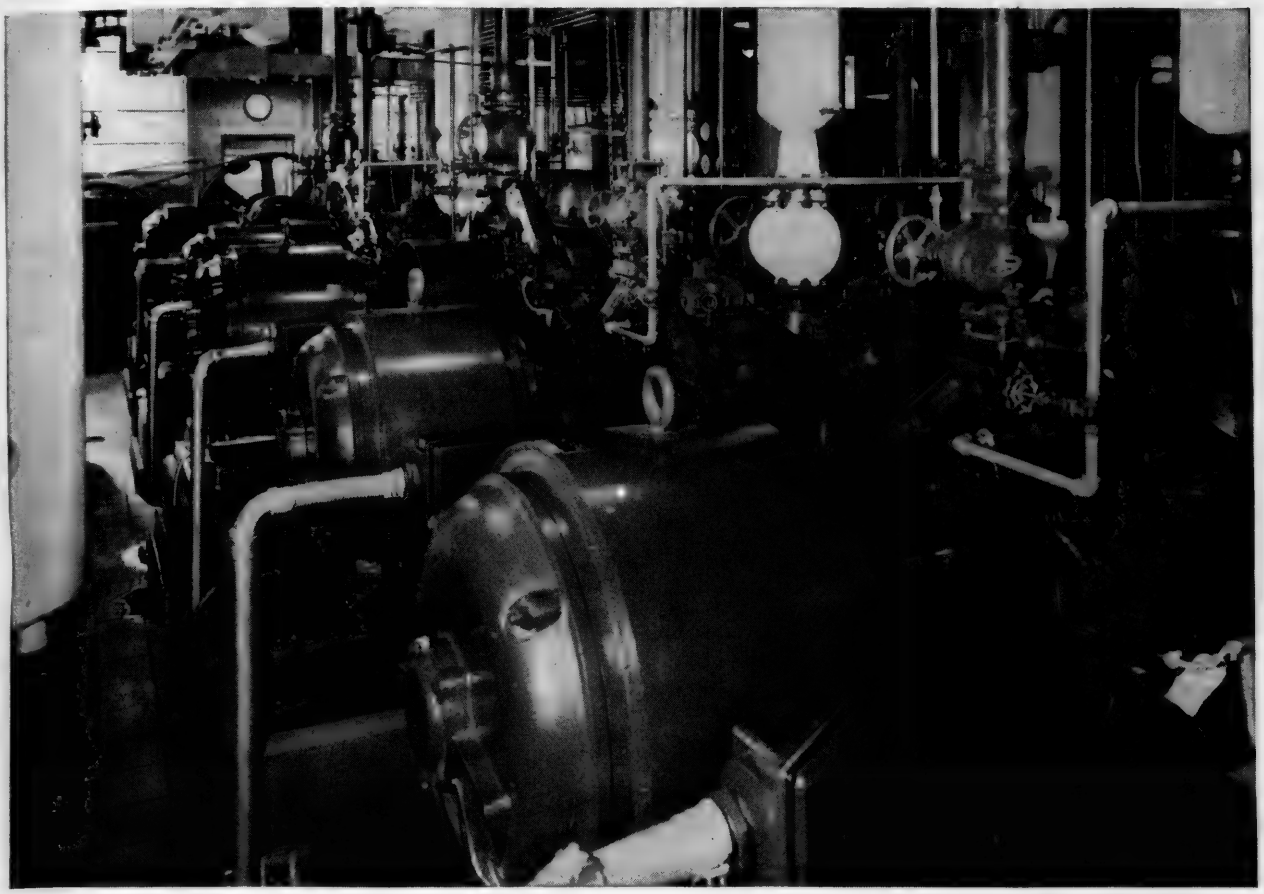
CORROSION CONTROL — Corrosive control and balance in year-around air conditioning systems are discussed in a heating and air conditioning booklet prepared by Permaglas Div., A. O. Smith Corp., Kankakee, Ill. Booklet includes construction data and gives complete specifications for the Division's heating and cooling products.

Circle **Item 84** on Inquiry Card

CORROSION-RESISTANT PIPE — For those involved in the problems of corrosion and high temperature services, technical data in ASL 285 and 286 is issued by Tubular Products Div., The Babcock & Wilcox Co., Beaver Falls, Pa. ASL 285 offers up-to-date data on Croloy 27-4-1 (Type 329) in tubular form, and ASL 286 furnishes the same information on Croloy 25-12 (Type 309S).

Circle **Item 85** on Inquiry Card

(*Continued on page* 134)



Solve big motor starting problems with Wagner Increment Motor-Starter Combinations!

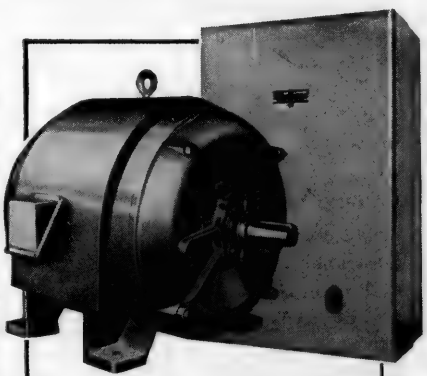
Eliminate "across the line" starts — cut voltage drop and line disturbance

This line of Wagner Increment Start Motors, ranging from 60 to 150 hp, and operating at speeds from 575 to 1160 rpm, drive compressors in a Memphis food processing plant. The motors start quickly and easily, with a minimum of line voltage disturbance, because they are designed for increment starting and are furnished with increment type starters.

Wagner Increment Motor-Starter Combinations provide *low cost control* . . . do not interrupt current between "start" and "run", as is the case with auto-transformer type starters . . . do not affect the running characteristics of the motors . . . yet fully meet the polyphase motor starting recommendations of the AEIC-EEI-NEMA.

Wagner two-step motor and starter combinations are suitable for most applications. For installations where unusually low inrush of starting current is required, Wagner can furnish 3, 4, 5, or 6 step increment motor-starter combinations.

Why don't you investigate the possibilities for savings by using Wagner Increment-start Motor Combinations on your big jobs? Your nearby Wagner engineer will help you select the increment motor and starter combination that meets your requirements. Call the nearest of our 32 branches or write for Bulletins MU-128 and MU-195.



Type RP polyphase motor — in ratings to 500 hp. with increment type starter.

M57-9

BRANCHES AND DISTRIBUTORS IN ALL PRINCIPAL CITIES

Wagner Electric Corporation
6463 Plymouth Ave., St. Louis 14, Mo., U.S.A.

ELECTRIC MOTORS • TRANSFORMERS • INDUSTRIAL BRAKES • AUTOMOTIVE BRAKE SYSTEMS—AIR AND HYDRAULIC

This Binks cooling tower, atop the Palmer House, is the heart of a newly augmented air conditioning system for 1735 guest rooms, dining and shopping facilities.

at the Palmer House in Chicago...

air conditioning water costs cut 96% by Binks cooling tower

"Our Binks cooling tower has done a great job for us," reports Chief Engineer John F. Edelhofer of the Palmer House Hotel. "Since June of 1956 our records show air conditioning water costs are only 4% of what they would have been under our old 'one-pass' system. In terms of volume, we are saving almost 7700 gallons per minute of operation. The tower should pay for itself in five years."

Cooling tower features

This tower is one of Binks 2-K vertical induced draft series. It cools and recirculates 8000 gallons per minute. Water enters at 95°F and leaves at 85°F. Four 12' diameter aluminum alloy fans assure scientifically balanced air-to-water ratio for high cooling efficiency under all climatic conditions. All panels and framework in the 72' by 42' tower are heavily galvanized and coated to insure minimum maintenance.

A complete line

Whether it is for air conditioning or the cooling of manufacturing process fluids, there is a Binks cooling tower of the correct capacity and type for every job.

Send for complete data

Ask your Binks branch office for a copy of Bulletin 333 and Bulletin 477-A or write direct to the address below. Binks engineers will be glad to answer your questions and help you solve your cooling problems. There's no obligation.

7159

Binks
EVERYTHING FOR WATER COOLING

A COMPLETE LINE OF NATURAL DRAFT AND MECHANICAL DRAFT COOLING TOWERS AND INDUSTRIAL SPRAY NOZZLES

Binks Manufacturing Company
3120-38 Carroll Ave., Chicago 12, Ill.

REPRESENTATIVES IN PRINCIPAL U.S. & CANADIAN CITIES • SEE YOUR CLASSIFIED DIRECTORY

NEW CATALOGS

(*Continued from page* 132)

Use the prepaid postcard on page 97 for securing your copies of catalogs described in this department.

GOOD BUSINESS MANAGEMENT—A new business management program is being offered to plumbing, heating and air conditioning contractors by the American-Standard Plumbing and Heating Div., New York, N. Y. Included in the program is a new motion picture, Your Witness, which points up many of the business management problems encountered by contractors. The film covers such subjects as the keeping of adequate records, discounting of bills, product pricing, overhead control and the maintenance of sufficient profit margins.

Circle **Item 86** on Inquiry Card

ALUMINUM SUN CONTROL DEVICES—A bulletin describing aluminum sun controls is available from Construction Specialties, Inc., Newark, N. J. The 12-page brochure contains photographs and drawings of industrial, institutional and commercial installations, as well as detailed specification data on the company's cantilever sun shades, anchorage devices, accessories, horizontal line sun curtain, fixed and operating vertical panels, and automatic solar controls for the latter. The last page lists sales and engineering representatives in 39 states.

Circle **Item 87** on Inquiry Card

MAGNESIA INSULATION SLIDEFILM—"Molded Masters of the Btu" is the title of a color sound slidefilm produced by The Magnesia Insulation Manufacturers Association, Washington, D. C. Describing a family of four thermal insulations produced by its members for piping and equipment ranging from 200 to 1,900 deg F, the film depicts insulating theory, ingrecients, production, application, and the properties of insulating materials required for various installations. Supervised showings are offered to any groups interested in thermal insulation. Insulation authorities are available to lead discussions following the film showings.

Circle **Item 88** on Inquiry Card

ARC WELDERS—A new arc welding machine and accessory catalog is now available from Air Reduction Sales Co., a division of Air Reduction Co., New York, N. Y. Selenium rectifier and d-c motor generator arc welders for industrial welding, a-c and d-c engine driven arc welders for construction and maintenance, a-c transformer arc welders for plant, farm, ranch, garage and shop use are examples of the complete line of welding machines illustrated and described in this catalog. Specifications for each machine, from ampere ratings to outside dimensions, are included.

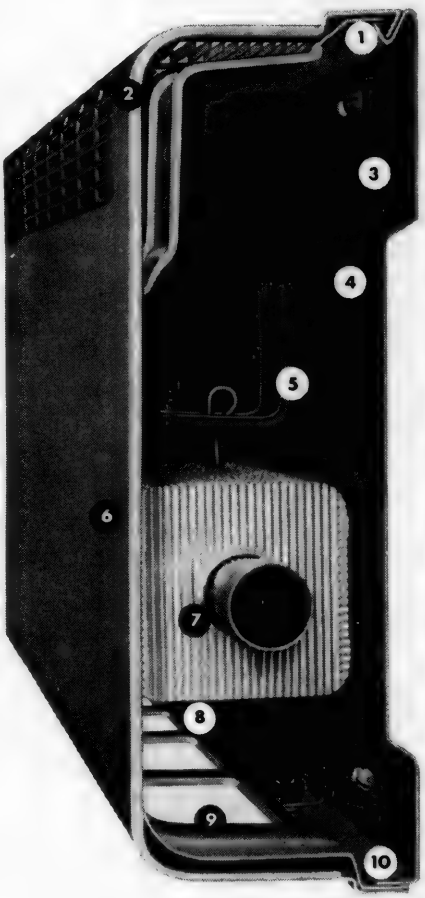
Circle **Item 89** on Inquiry Card

(*Continued on page* 136)

CRANE

1. Interlock supports front at top
2. Curved louver grille discharges upward and outward
3. Panel prepunched for fastening to wall
4. One-piece back panel supports ensemble
5. Adjustable heating element hanger
6. Front (16 gauge) completely encloses heating element on three sides
7. Copper-tube, aluminum fin heating element
8. Attractive extruded inlet grille
9. Integral vertical channel braces
10. Bottom interlock for front support

(Knob-operated damper optional)



Style A Enclosure

10 good reasons for specifying Sunnywall radiation

for all types of commercial buildings

Never before has there been a radiation that excels so greatly in *both* strength and appearance!

Enclosure front panels are constructed of heavy (*16 gauge*) furniture steel and are coated with a baked enamel finish (available in six colors!). They are formed in such a manner as to provide exceptional longitudinal strength and vertically braced with two or more die-formed channel supports to form a single rugged unit.

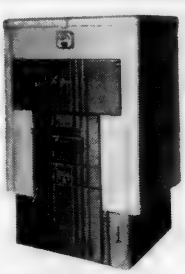
Crane Sunnywall heating elements, too, possess great durability. Their corrugated fins have the strength of flat fins twice the thickness, are more resistant to damage.

The durability of the entire ensemble helps make Crane Sunnywall the ideal radiation for all types of commercial buildings where equipment must be able to withstand long years of hard service.

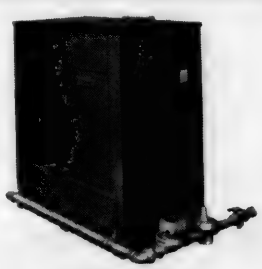
Crane Sunnywall is suitable for both hot water and steam systems. A full line of accessories and optional equipment makes it tremendously versatile.

See your Crane Branch or Crane Wholesaler. Get full details on Crane Sunnywall radiation and *all* your commercial heating requirements.

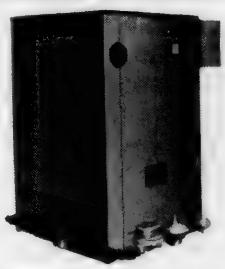
TEAM UP SUNNYWALL WITH THESE HIGH-CAPACITY CRANE SUNNYDAY BOILERS



SUNNYDAY 30
268,000 to 1,367,000 Btu/hr.
gross IBR output



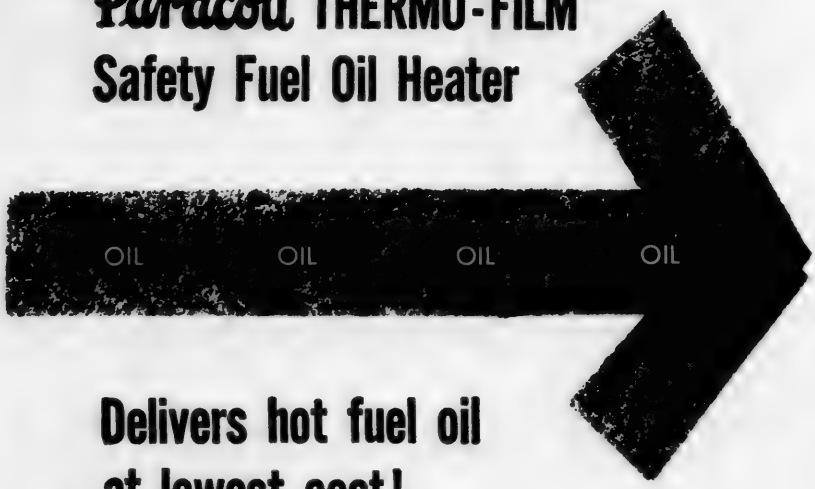
SUNNYDAY 40
350,000 to 2,380,000 Btu/hr.
AGA input



SUNNYDAY 60
625,000 to 5,000,000 Btu/hr.
AGA input

CRANE CO. 836 South Michigan Avenue, Chicago 5 • VALVES • FITTINGS • PIPE • PLUMBING • KITCHENS • HEATING • AIR CONDITIONING

Paracoil THERMO-FILM* Safety Fuel Oil Heater

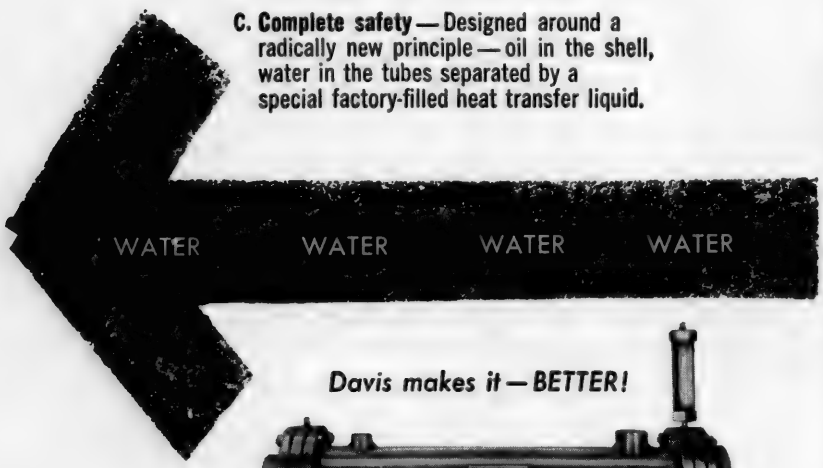


Delivers hot fuel oil at lowest cost!

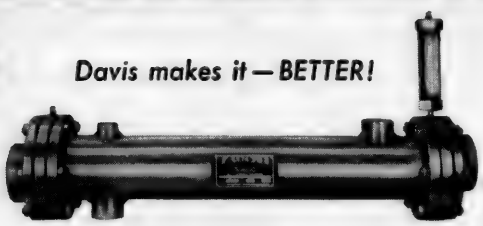
a. **High oil exit temperatures** — Full rated capacity because of 100% true counter-flow straight tube construction. And, extended tube surface greatly increases heat transfer capacity.

b. **Cheaper installation** — No electric wiring. No warning systems to install. Lightweight, compact unit requires no special supports.

c. **Complete safety** — Designed around a radically new principle — oil in the shell, water in the tubes separated by a special factory-filled heat transfer liquid.



Davis makes it — BETTER!



LOWER FIRST COST...LOWER INSTALLED COST

Approved by Board of Standards and Appeals, City of New York. Cal. No. 321-55SA

Write for Bulletin 60 N.

DAVIS ENGINEERING CORPORATION

30 Rockefeller Plaza, New York 20, New York Circle 6-5650

1064 East Grand Street, Elizabeth 4, New Jersey ELizabeth 2-6780

*Trademark/Patent Pending

NEW CATALOGS

(*Continued from page* 134)

Use the prepaid postcard on page 97 for securing your copies of catalogs described in this department.

PACKAGED AIR CONDITIONING UNITS —A two-page bulletin describing 3, 5, and 8-ton packaged air conditioning units is now available from Typhoon Air Conditioning Co., Inc., Division of Hupp Corporation, Brooklyn, N. Y. Illustrating the compact size and styling of the units, the bulletin provides a table of specifications and ratings for the three models. It clearly points out the ease and speed with which the units may be installed, as well as the economy of their operation. Further, the quiet, economical compressor operation, the automatic controls, and safety features are specifically outlined.

Circle **Item 90** on Inquiry Card

AUTOMATIC AIR FILTER — Bulletin 248-A, published by American Air Filter Co., Inc., Louisville, Ky., has 8 pages of illustrations and data, including capacity tables, on its Roll-O-Matic automatic renewable media air filter. Installation and dimensional information is supplied.

Circle **Item 91** on Inquiry Card

PACKAGED WATER SYSTEMS — Two new packaged water systems, for shallow and deep well applications, are described in a 1957 guide to pump and water systems, published by Goulds Pumps, Inc., Seneca Falls, N. Y. This guide also includes information on selecting a water system, descriptions of other pumps for shallow, deep well or dual service, and pumps for special applications.

Circle **Item 92** on Inquiry Card

VITRIFIED CLAY PRODUCTS—A four-page technical bulletin, Vitrified Clay Products, has been published by Robinson Clay Products Co., Akron, Ohio. Designed for quick reference, the fully illustrated bulletin contains complete data specifications and dimensions for the company's clay products including vitrified clay pipe, clay liner plates, clay flue lining, wall coping, septic tanks, and ventilator caps.

Circle **Item 93** on Inquiry Card

STEEL TUBE FITTINGS—A new 48-page catalog, Steel Tube Fittings is published by The Weatherhead Co., Fort Wayne Div., Fort Wayne, Ind. The catalog incorporates complete engineering data on the company's hydraulic flareless and flare type tube fittings. A section is devoted to assembly instructions, materials, finishes and operating pressures.

Circle **Item 94** on Inquiry Card

(*Continued on page* 138)

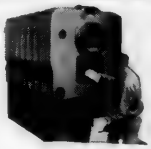
THE "EASIER" BOILER

Easier to insulate

Easier to erect

Easier to install breeching

Easier to enlarge capacity



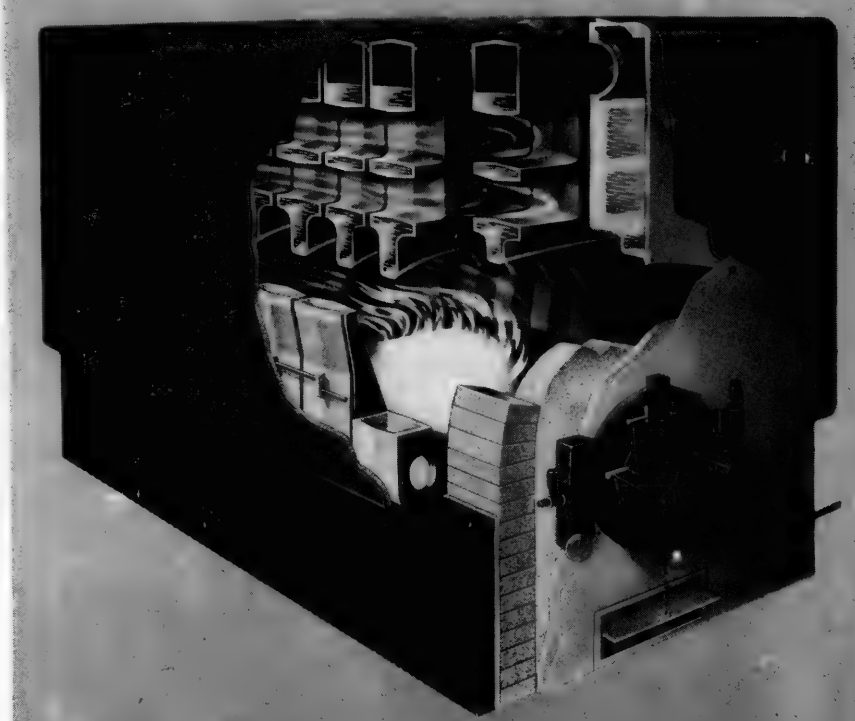
Easier to build combustion chamber

Easier to install burner on special steel front plate

It is also easy to see why the Weil-McLain "HR" Series Boiler is completely outstanding for commercial, institutional and industrial installations.

This boiler was designed in cooperation with leading manufacturers of horizontal rotary oil burners and has their approval. The extra large combustion volume, greater primary heating surface, low heat release and balanced flue gas travel are among the features which contribute to highly efficient combustion and heat absorption. That's why the "HR" Boiler most effectively develops the economies obtainable with low-cost, heavy oils.

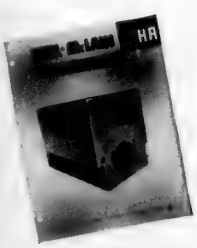
Cast iron sectional construction offers easier erection...less required space...easy enlargement of capacity...low maintenance cost and longer life. The special steel front of the "HR" greatly simplifies installation of the burner. A Weil-McLain "*extra value*" in every detail!



WEIL-McLAIN

HR SERIES BOILERS

FOR HORIZONTAL ROTARY OIL BURNERS



For complete data send for Bulletin C-188

WEIL-McLAIN BOILERS · RADIATORS

Address Literature requests to Dept. BB-37

WEIL-McLAIN COMPANY

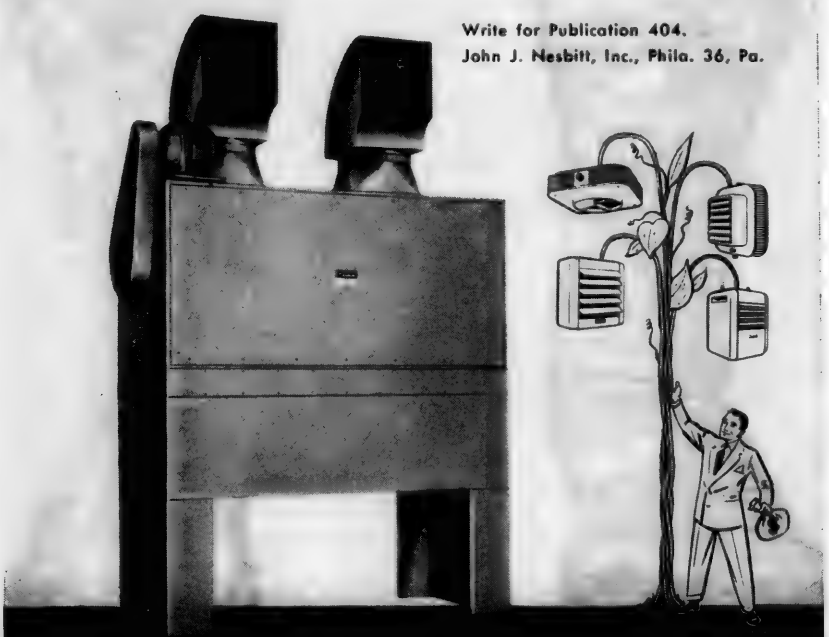
MICHIGAN CITY, INDIANA

JACK and the GIANT

Once upon a time there was a heating contractor by the name of Jack. Now this wise fellow did a lot of industrial and commercial work, and he picked all his equipment from a big plant started by John J. Nesbitt more than 40 years ago. On this plant grow all kinds of industrial unit heaters: propeller fan, blower fan, and gas-fired heaters; and the biggest of them all, called the Giant.

Now one day Jack had a terrific big job to do, requiring a unit with heating capacity in excess of 1,500,000 Btu, so naturally he called upon the Nesbitt Giant, for he knew it could handle the job with the greatest of ease. After all was said and done, Jack—well he made a lot of *jack;* and he satisfied his customer as well.

Write for Publication 404.
John J. Nesbitt, Inc., Phila. 36, Pa.



Nesbitt

THE NAME TO GO BUY IN UNIT HEATERS

NEW CATALOGS

(*Continued from page* 136)

Use the prepaid postcard on page 97 for securing your copies of catalogs described in this department.

CONDENSING UNITS—Data sheet 493 includes specifications and capacities for open type refrigeration and air conditioning condensing units from ¼ hp through 100 hp offered by Brunner Mfg. Co., Utica, N. Y. Specifications are included for compressor units for use with evaporative condensers, ⅛ to 100 hp, as well as simple compressors in single and 2-stage for use with hp up to 100.

Circle **Item 95** on Inquiry Card

PUSH BUTTON CONTROLS — How to select the right push button for every application is the purpose of a 32-page catalog, No. 5606T, covering oil tight and general purpose push buttons, pilot lights and accessories. Catalog which is published by Furnas Electric Co., Batavia, Ill., includes description of components and complete units, dimensions, cam action and schematic diagrams. All types and styles are illustrated.

Circle **Item 96** on Inquiry Card

CONVERSION CHART—As an aid to estimating the amount of material necessary to insulate cylindrical vessels, the Armstrong Cork Co., Lancaster, Pa., has developed a chart for converting gallon quantities into square feet of surface area. The chart was developed to eliminate complex mathematical calculations when vessels, such as domestic hot water tanks and expansion tanks, are designated only by gallon size, or by length and diameter.

Circle **Item 97** on Inquiry Card

PULLING DEVICE—A bulletin describing the company's pulling device is available from Chisholm-Moore Hoist Div., Columbus McKinnon Chain Corp., Tonawanda, N. Y. Designated 146-G, the bulletin provides specifications and applications as well as operational and maintenance features of the aluminum alloy tool.

Circle **Item 98** on Inquiry Card

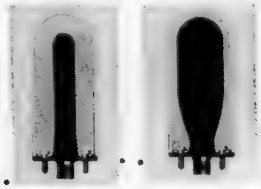
HEATING, VENTILATING CONTROLS—Its line of electric-electronic automatic controls for heating and ventilating systems in schools, colleges, and other institutional buildings is contained in 16-page Bulletin F-7773, published by Barber-Colman Co., Rockford, Ill. Schematic diagrams show various systems with location of controls. Control centers, thermostats, and diffusers are illustrated.

Circle **Item 99** on Inquiry Card

(*Continued on page* 140)

in plumbing drainage... it costs no more for the...

VERY BEST



ABSORBO tube and insert shown in normal position, before faucet or valve is opened.

ABSORBO tube expands against insert as it absorbs shock and energy caused by sudden closing of valve or faucet, or sudden change in flow.

As shock recedes, tube and insert return to normal positions as in figure at left.

Josam

series 1480

SHOCK ABSORBERS

ELIMINATE "WATER HAMMER"!

• Noisy, destructive water hammer is unpredictable — it will occur on the finest installations — it happens without warning on any water or liquid plumbing supply line — in schools, hotels, theatres, hospitals, institutions — and even in homes. Josam Shock Absorbers eliminate this disturbing noise, the possible damage to equipment, and destructive leaks in valves and connections. You get "hospital quiet" on all plumbing lines! Their cost is so little compared with the protection they provide, that Josam Shock Absorbers should be installed on every new and old piping system. Here again, it costs no more to use the best — *in plumbing, you use the best when you use JOSAM!* It costs less in the "long run".

Send coupon for free literature.

JOSAM MANUFACTURING COMPANY

General Offices and Manufacturing Division
MICHIGAN CITY, INDIANA

REPRESENTATIVES IN ALL PRINCIPAL CITIES

West Coast Distributors
JOSAM PACIFIC COMPANY
San Francisco, Calif.

Canadian Manufacturers
JOSAM CANADA LIMITED
Toronto, Canada

Josam products are sold through plumbing supply wholesalers.

JOSAM MANUFACTURING COMPANY
Dept. HV-3 • Michigan City, Indiana

Please send copy of Manual "S" on Water Hammer

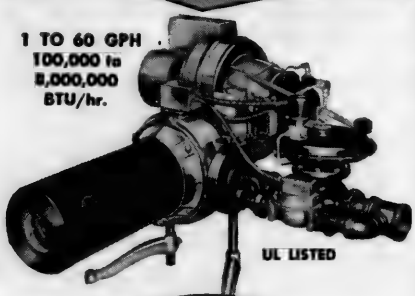
Firm ..... Business .....

By .....

Address .....

City ..... Zone ..... State .....

DUAL FUEL SITUATIONS NEED EXTRA THOUGHT



GAS syncro flame OIL

OIL/GAS BURNERS HAVE EXTRA FEATURES FOR SURER SUCCESS

In those situations where you can take advantage of off-peak gas rates, it is often possible to reduce heating costs substantially. The SYNCRO/FLAME Dual Fuel Burner is designed *especially for such circumstances.* Various distinctive features have been incorporated, to provide *outstanding performance.* One of these is . . .

AUTOMATIC CHANGE-OVER

. . . which can be accomplished by outdoor thermostat or any other suitable sensing switch. Other features include a positively non-pulsating gas flame, graduated light-off, pre-purge and post-purge on larger models, separate automatic adjustments for maximum efficiency with each fuel, and explosion-free gas control circuitry.

FREE LITERATURE

Write today for descriptive circulars describing all features, and giving full specifications on wide range of sizes available. Ask for Catalog 551.

MANUFACTURERS OF OIL AND GAS AND OIL/GAS BURNERS

SYNCHRONOUS FLAME, INC.

WALWORTH • WISCONSIN

NEW CATALOGS

(*Continued from page* 138)

Use the prepaid postcard on page 97 for securing your copies of catalogs described in this department.

ZONED CONDITIONING MANUAL—Engineering data on multi-zone air conditioning with its 9-model line of single unit equipment is contained in EMG-57110 engineering manual published by Drayer-Hanson, Div. of National-U. S. Radiator Corp., Los Angeles, Calif. Nominal rating table, selection and air friction data, coil capacities, and full specifications show 32 possible arrangements that may be had from standard fan, coil, motor, and filter components.

Circle **Item 100** on Inquiry Card

INDUSTRIAL INSULATING PRODUCTS—Full specifications for their complete line of spun mineral wool industrial insulating products are presented in a new catalog just published by Baldwin-Hill Co., Trenton, N. J. The catalog, which lists standard sizes, thicknesses, and thermal conductivities for more than 20 types of heat and cold insulations for equipment and piping, also includes temperature-thickness recommendations for each. In addition to the characteristics of the materials themselves, the twenty-page catalog describes typical applications and provides application instructions.

Circle **Item 101** on Inquiry Card

AIR DIFFUSER SELECTION MANUAL—Anemostat Corp. of America, New York, N. Y., announces the publication of 80-page selection manual No. 60 on air diffusers for air conditioning, heating and ventilating systems. It supersedes selection manual No. 50. Manual contains numerous diagrams, tables and photographs to aid in the correct selection of diffusers and accessories for all-air high velocity as well as conventional air conditioning systems and units. Included also are air distribution definitions, sound level characteristics, static pressure factors, and typical installations.

Circle **Item 102** on Inquiry Card

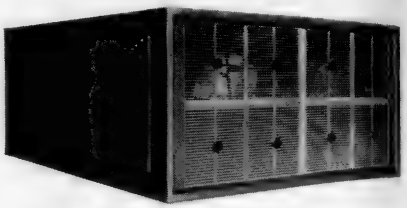
POWER ROOF VENTILATORS—Bulletin 3904 published by American Blower Corp. Div. of American-Standard, Detroit, Mich., describes each of 4 models in its improved blower line. Performance data for 16 sizes of Model VRV upblast type exhaust ventilator, 21 sizes of Model HRV hood type exhaust ventilator, and 20 sizes of Model SSV hood type supply ventilator are tabulated. Included are fan speeds, motor horsepower, and certified delivery ratings. Also included are intake and duct area values for 5 sizes of Model WSV air intake hood. Installation drawings are provided for each of the four power roof ventilator models.

Circle **Item 103** on Inquiry Card

(*Continued on page* 142)

Bright Star IN YOUR AIR CONDITIONING FUTURE

NEW Barkow WEATHERWISE

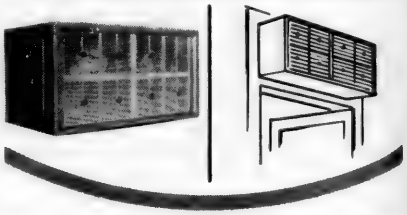


SUPER-FIVE

Self-Contained 5-Ton Air Conditioner

★ *Saves Floor Space*

★ *Installs without Ducts, Waterlines*



Here's a "world-beater" . . . a new, modern, streamlined FOUR-WAY Air Conditioning Unit that you mount through walls windows or transoms — without ducts or waterlines! Saves hundreds of dollars in installation time and cost. Arrange one or more units to fit space to be cooled — in stores, supermarkets, offices, restaurants, factories. Individually controlled by FOUR-WAY Thermostats — for cooling, ventilating, recirculation, at new low cost. Engineered for long trouble-free service.

Get the jump on Cooling Sales this year. Write for specifications and prices on new BARKOW WEATHERWISE SUPER-FIVE Self-Contained Air Conditioners *now!*

Full line of Barkow WEATHERWISE Air Conditioners available in sizes from 2 up to and including 10 ton.

AUG. G. Barkow MFG. CO., INC.

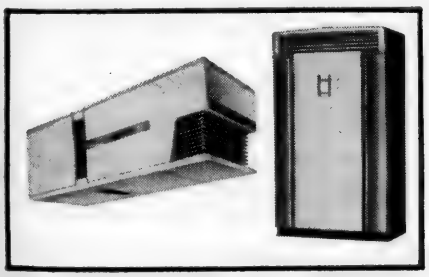
2231 S. 43rd ST. • MILWAUKEE, WIS.

Air Conditioning *at low cost* in a men's clothing factory, with its many batteries of steaming presses, was considered impractical—until General Electric Zone-by-Zone Air Conditioning solved the problem for H. Daroff & Sons, Philadelphia, manufacturers of Botany "500" and Worsted-Tex clothing. Note that General Electric Ceiling-Mounted Units take no floor space—require little or no ductwork.

General Electric Zone-by-Zone Method

selected for world's first fully air conditioned men's clothing plant

H. Daroff & Sons, Phila., first plant of its type to be fully air conditioned—thanks to General Electric Zone-by-Zone method.



CEILING-MOUNTED UNITS (left). Use no floor space—air-cooled and water-cooled.

FLOOR-MOUNTED UNITS (right). May be stationed in space or away from area served.

The H. Daroff and Sons plant is a typical example of how General Electric Zone-by-Zone Air Conditioning fully meets requirements for any type of factory or office building—even overcomes seemingly insurmountable problems. This system is also a sure way to solve budgeting problems. It is easy to install—no costly interruptions—no major alterations—no heavy initial outlay. Its operation is economical, and it minimizes the problem of space.

More and more architects are specifying General Electric Zone-by-Zone Air Conditioning as the most practical answer for every requirement. General Electric Company, Commercial and Industrial Air Conditioning Dept., 5 Lawrence St., Bloomfield, N. J.

Progress Is Our Most Important Product

GENERAL ELECTRIC

In Canada, Canadian General Electric Co., Ltd., Montreal

MERCOID®

WEATHER RESISTANT CONTROLS

VISIBLE

CALIBRATED DIAL
ON-OFF SWITCH POSITION
OPERATING POINT INDICATORS

for pressure or temperature

HERMETICALLY SEALED CONTACT
ZINC PLATED STEEL CASE
OUTSIDE ADJUSTMENTS

FOR OUTDOOR SERVICE OR OTHER APPLICATIONS (NEMA 1A, 2, 3, 4)

Drip Tight
Semi-Dust Tight
Weather Resistant
(Weather Proof)
(Splash Proof)
(Sleet Proof)
(Moisture Resistant)
(Rain Tight)
Weather Tight
(Hose Test)

Write for catalog No. 857W which also lists general purpose controls (NEMA 1) and explosion proof controls (NEMA 7, 9, 9A).

THE MERCOID CORPORATION
4201 Belmont Ave., Chicago 41, Ill.

NEW CATALOGS

(*Continued from page* 140)

Use the prepaid postcard on page 97 for securing your copies of catalogs described in this department.

SHADED POLE MOTORS—Shaded-pole motors for fan and blower applications in ratings 1.5 watts through ¼ hp are described in Bulletin GEA-6134A published by General Electric Co., Schenectady, N. Y. Application, rating, and dimension data on 5½-in. (39-frame) motor rated 1/12 through 1/4 hp, 5-in. (21-frame) motor rated 25 mhp through 1/12 hp, 4-in. (11-frame) motor rated 15 mhp through 35 mhp, and 3½-in. (51-frame) motor rated 1.5 through 16 watts are given. Publication shows product features and lists accessories.

Circle **Item 104** on Inquiry Card

AIR, FUEL, FLUE GAS MEASUREMENT—A new bulletin, No. 138, available from General Scientific Equipment Co., Philadelphia, Pa., illustrates and describes a line of gas pressure manometers, oil flow graduates, sling psychrometers, air velocity meters, filter gauges, recording thermometers, carbon monoxide detectors, kits for testing gas heating equipment, CO_2 indicators, smoke testers, draft gauges, flue gas thermometers and pressure point testers.

Circle **Item 105** on Inquiry Card

AMMONIA CEILING COILS—Catalog 2C6a on water defrost ceiling coils is issued by Refrigeration Engineering, Inc., Los Angeles, Calif. Included are dimensional and specification data on Model AS3100LT, a 5-ton ammonia ceiling coil. Other information includes data on sizes of accumulators for use with flooded ammonia ceiling units, dimensional changes showing the pitched drain pan now used, and changes in the heat exchanger dimensions.

Circle **Item 106** on Inquiry Card

CABINET CONVECTORS — Dunham-Bush, Inc., West Hartford, Conn., has issued a 28-page data guide on code-rated cabinet convectors for steam and hot water heating systems. This brochure lists details of the company's convector cabinet design and construction features for installation in commercial, industrial, residential, and institutional buildings. In addition, there are hot water capacity statistical tables for all models, miscellaneous capacity data, and typical piping arrangements for both hot water and steam systems.

Circle **Item 107** on Inquiry Card

(*Concluded on page* 144)

Get the Answers!

To your equipment installation problems

If you work with—

CENTRIFUGAL COMPRESSORS
RECIPROCATING COMPRESSORS
COOLING TOWERS
AIR HANDLING UNITS
PACKAGED LIQUID CHILLERS

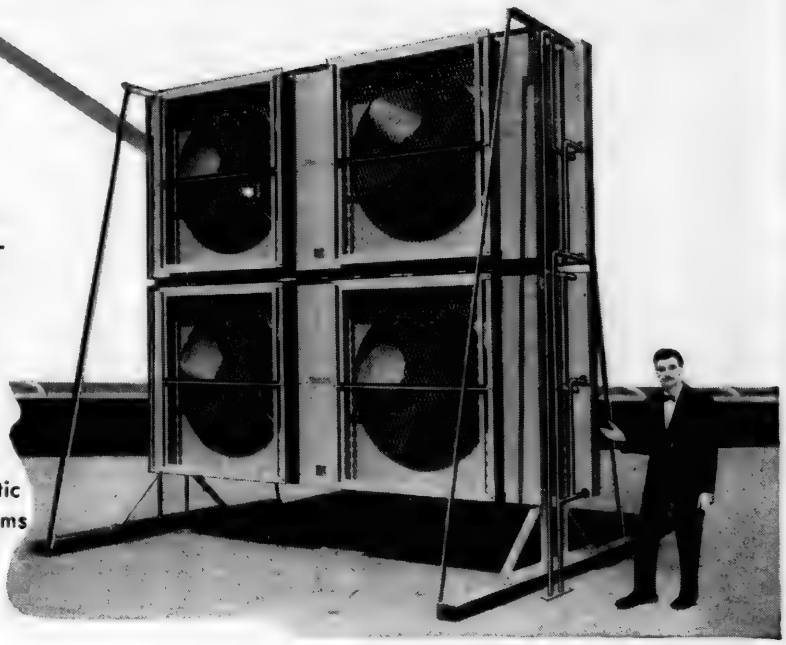
FANS
BLOWERS
PUMPS
PIPING
BOILERS
UNIT HEATERS

or What have you?...

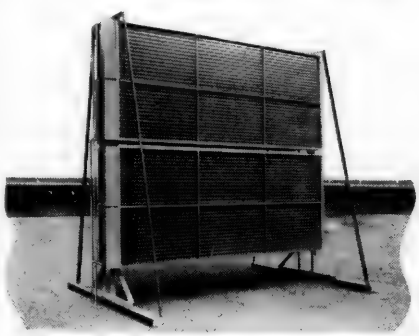
Korfund's complete line of products give you the right answer the first time to your installation, vibration and noise problems. Write for Bulletin 44 which gives full details.

THE KORFUND COMPANY, INC.
48-01E Thirty Second Place, Long Island City 1, N.Y.
In Canada: 510 Canal Bank, Ville St. Pierre, Montreal

KRAMER UNICON GETS BIGGER and BIGGER



There is only one answer to large capacity condenser problems — the KRAMER UNICON. Every day more engineers plan larger tonnage installations — 50, 100 and even — 800 tons. And every day UNICONS are shipped to all parts of the world for giant-sized installations. No other air-cooled condenser can match the long, successful record of UNICON, backed by thousands of applications since 1937 — in the widest range of tonnages and climatic conditions. Your condensing problems can be best answered by use of the best — the KRAMER UNICON.



Space-saver UNICON, *as illustrated,* serves a 60-Ton air conditioning system, yet takes but 70 sq. ft. of roof space.

UNICON is a remote-type air-cooled condenser that requires no water. KRAMER UNICON can be used with any size compressor, REGARDLESS of horsepower. Any size refrigeration or air conditioning system can be air-cooled with UNICON, REGARDLESS of tonnage. UNICON requires less horsepower, less piping, is easier to install and costs less. KRAMER UNICON performs best — even in semi-tropical climates.

WRITE FOR BULLETIN U-210D

KRAMER TRENTON CO. • Trenton 5, N.J.

for FUME

CONTROL

install

FLEXAUST®

HOSE

Made of strong neoprene coated cotton or nylon fabrics spiral wire reinforced.
For *all* kinds of fume and dust control, and ventilation uses.
Extremely flexible, durable, and lightweight.
Exceptionally easy to cut, install, connect, reuse, and relocate.
Sizes 1¼" thru 36" i.d.

Write for details today
Distributors
in all principal cities

THE FLEXAUST COMPANY
Dept. HV-3
[illegible] PARK AVE., NEW YORK 17, N. Y.

NEW CATALOGS

(*Concluded from page* 142)

Use the prepaid postcard on page 97 for securing your copies of catalogs described in this department.

HEATING AND REFRIGERATION SYSTEMS—New and expanded facilities for the manufacture of specialized heating and refrigeration systems for military and transport users by Hunter Mfg. Co., Solon, Ohio, are described and illustrated in a 4-page folder published recently. Products include space heaters for mobile and portable military shelters, for radio, radar and guided missile control and maintenance installations, a complete line of gasoline and LP-gas heaters, and mechanical and controlled dry ice refrigeration systems.

Circle **Item 108** on Inquiry Card

SHEET METAL WORKING TOOLS—Just published, illustrated 32-page Booklet 201 catalogs briefly the line of manually operated machines and tools for light sheet metal work from Niagara Machine & Tool Works, Buffalo, N. Y. Pocket-size, this handy reference guide contains summarized data and descriptions of all important models. For complete information on any particular item, references are made to specific company bulletins, easily obtainable by mailing a postage-free reply card in the back of the booklet.

Circle **Item 109** on Inquiry Card

STAINLESS STEEL PROPERTIES—A new publication, Stainless Steels Types 308, 309 and 310, which have increased chromium and nickel content over stainless steel types 302 and 304, is now being distributed by Allegheny Ludlum Steel Corp., Pittsburgh, Pa. This eight-page booklet contains detailed information on the types including such information as physical properties, heat treatment, strength at elevated temperatures, fatigue strength, and resistance to oxidation.

Circle **Item 110** on Inquiry Card

VALVES FOR HAZARDOUS FLUIDS—Packless valves for applications involving hazardous liquids and gases, as well as for nuclear energy installations, are described in a 22-page bulletin, Catalog F, published by Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn. More than 20 cutaway views of different packless valve models are included in the three-color booklet. Detailed data on specifying and ordering, and charts concerning the application and selection of the valves, also are included. One chart lists the resistance of various metals used to the corrosive action of more than 200 different chemicals and gases.

Circle **Item 111** on Inquiry Card

REGISTERS AND GRILLES—Publication of Register-Grille Catalog 76-C is announced by Carnes Corporation, Verona, Wis. This catalog is profusely illustrated with products, accessories and engineering data. Also listed is the new and improved curved blade, or waterfall design, return air grille; all others have streamlined hollow blades. All engineers and architects who have not witten for their condensed field file of the company's products are reminded again that these binders are still available.

Circle **Item 112** on Inquiry Card

FUEL OIL PUMPS—A new 8-page catalog, No. 107, contains complete information on a new line of Type-SU pump units, available from Tuthill Pump Co., Chicago, Ill., which are designed principally for handling heavy fuel oils in industrial and commercial oil burner service. The new units may also be used for the movement of any non-corrosive, highly viscous liquid with lubricating qualities. The catalog contains detailed information on the new units which may be furnished with a wide variety of motor and pump combinations and 2 or 4 V-belt drives.

Circle **Item 113** on Inquiry Card

COMBUSTION CONTROLS — A new catalog on combustion controls and instruments, representing a single source of information covering a complete line of automatic controls and instruments for the combustion industry, is offered by General Controls Co., Glendale, Calif. The catalog covers everything required for a complete combustion installation such as automatic draft control instruments and actuators; solenoid, diaphragm and motor-operated valves for oil, gas, steam and water; time switches, relays and oil burner primary controls.

Circle **Item 114** on Inquiry Card

WATER SYSTEMS—A 76-page commercial catalog, C-57, published by The Deming Company, Salem, Ohio, contains the firm's entire line of water systems and other commercial pumps. The new catalog includes selection, performance and dimension tables on all sizes and types of the company's commercial pumps, including the firm's newest water system; an increased size range of submersible pumps; a new line of multi-stage centrifugal water systems; and a new, low-priced cellar drainer.

Circle **Item 115** on Inquiry Card

UNDERDRIVE SQUARING SHEARS — New, illustrated Bulletin No. 69G, published by Niagara Machine & Tool Works, Buffalo, N. Y., contains complete information on the company's line of underdrive power squaring shears. 74 pages describe and illustrate fully such features as multi-jaw sleeve clutch; rigid, box type construction; self-compensating holddown; fully enclosed drive; low outline for complete visibility; four cutting edge knives and self-measuring back gage.

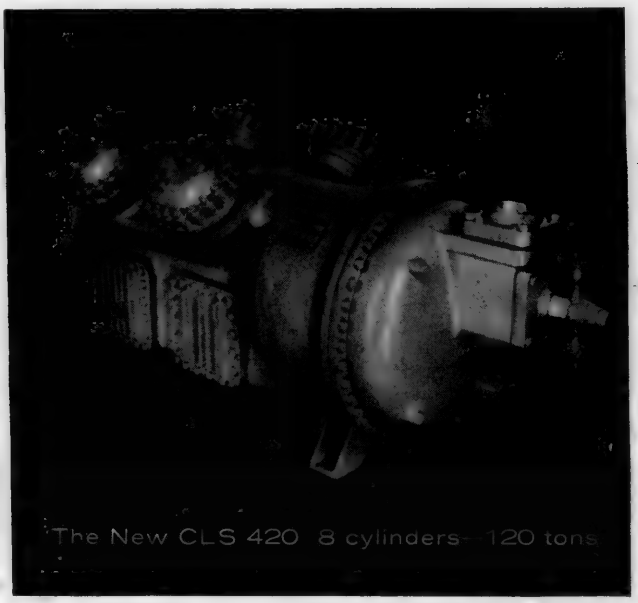
Circle **Item 116** on Inquiry Card

Exclusive... from **WESTINGHOUSE!**

Full Range of Hermetic Compressors

with 2 to 120 ton ratings

The New CLS 315 8 cylinders—90 tons



The New CLS 420 8 cylinders—120 tons

2 New Westinghouse Hermetic Types Give Larger Capacity in Smaller Size

Again Westinghouse leads in compressor manufacture. We introduced the first hermetics in 1937 . . . now—20 years later—this dependable compressor is the standard of the industry. And the full range of 14 hermetic types now includes compressors of 2, 3, 5, 7½, 10, 15, 20, 25, 30, 40, 50, 60, 90 and 120 ton ratings!

These two newest Westinghouse compressors are more compact, smoother operating, lighter, and easier to install. They give greatest performance in smallest space. They give more capacity per dollar. These are some of the many reasons you save on costs, installation labor, freight, and space with Westinghouse Air Conditioning Compressors and Accessories.

Hermetic Compressors by Westinghouse have been successfully proved in thousands of successful applications around the world. Their hermetic design permanently seals out dirt and moisture. Belts, pulleys and shaft seals are eliminated. They operate quietly. Requiring no ventilation, they may be installed where other types would be unsuitable.

Like all Westinghouse hermetic compressors, Type CLS 315 and CLS 420 are completely automatic in operation. A complete line of matching accessories and condensers is also available.

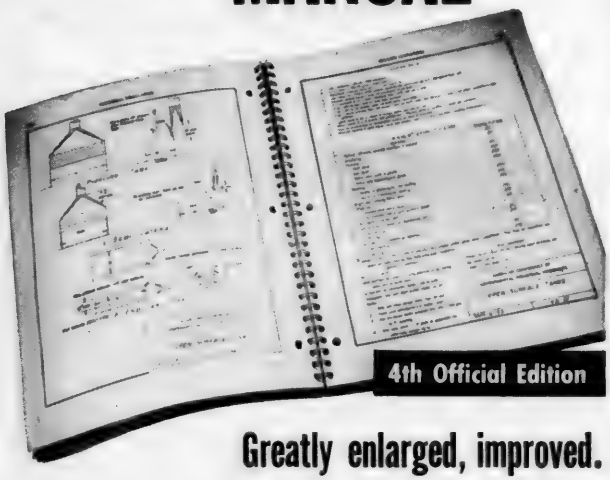
Get the full news and complete specifications from your Westinghouse Air Conditioning Office. You'll find it in the Yellow Pages!

YOU CAN BE SURE...IF IT'S **Westinghouse**

J-80531-A

WESTINGHOUSE ELECTRIC CORPORATION • AIR CONDITIONING DIVISION • STAUNTON, VA.

New! VENTILATION MANUAL



Greatly enlarged, improved. Many new tables on industrial ventilation.

Here's the latest edition of the authoritative Industrial Ventilation Manual—written by practicing field engineers. It's bigger, better . . . includes simple application drawings on most industrial ventilation operations. Invaluable to engineers and sheet metal fabricators.

Take a look at some of the many subjects in this year's edition:

Dilution Ventilation	**Make-up and Recirculated Air**
Comfort Ventilation	**Construction Specifications**
Hood Design	**Testing of Ventilation Systems**
Specific Operations	**Fans**
Duct Design	**Air Cleaning Devices**

The Ventilation Manual is the official publication of the American Conference of Governmental Industrial Hygienists and is used as a basic text by many leading universities. It contains all the information needed for the complete design of industrial ventilation systems. The recommended ventilation practices are approved by Federal, State, and Municipal Government Industrial Hygiene Departments.

The price is just $4. Mail the coupon for your copy today.

Committee on Industrial Ventilation
P. O. Box 453
Lansing 2, Michigan

Enclosed please find $_____ for _____ copies of the new 4th edition of the Industrial Ventilation Manual.

Name_____

Firm_____

Address_____

City and State_____

(*Continued from page* 128)

crisis. A Porto Rican nuclear center will be established this year and will tie in with United States' obligations to Latin America under the Atoms for Peace program.

On-the-job training for university people and industrial employees is being sponsored by AEC. Opportunities exist for outstanding students to do research, which becomes the basis for master's and doctor's degrees, at the Commission's laboratories. Massachusetts Institute of Technology has assigned graduate students for on-the-job participation at Oak Ridge. Current plant problems are submitted for solution by the students. Industry personnel have been participating in increasing numbers in programs of Commission contractors, usually for periods of one year. So far, some 53 different industrial firms have benefited.

$11-MILLION SHOWCASE

for building product displays is part of triple-purpose structure for Miami, Fla.

One of the top 10 industries in the United States, comprising companies producing building products, this year will have a new $11-million showcase to display approximately 10,000 different items manufactured by its component companies.

The huge Dupont Plaza Center, situated in the heart of downtown Miami, will open the doors of its first unit, the International Architects Bureau of Building Products before next winter. This unit, headed by Clinton T. Wetzel, will have capacity for between 800 and 1000 exhibitors.

• **FIRST TENANTS**—The first three tenants to contract for major display space in the new facility are Reynolds Metals of Louisville, Ky. and Richmond, Va.; Mosaic Tile Co. of Zanesville, Ohio; and Universal-Rundle of Newcastle, Pa. Scores of other concerns are now in process of working out final details on exhibit space they will utilize for their various building products.

Actually, the Dupont Plaza Center is the country's first integrated, triple-purpose structure, combining under one roof a building products display unit of 100,000 square feet, a 70,000 square foot office unit, and a 301-room hotel.

As topping on the corporate cake, this facility will also offer 1000 feet of yacht docking space along Biscayne Bay, which bounds the property on its southern limits.

• **PUBLIC WELCOME**—The public will be welcome, even aggressively invited, to visit these displays, but the main interest to building product manufacturers probably will be the fact that headquarters for seven architectural societies and associations of interior designers, engineers, contractors, interior decorators and home builders, will be located in the center.

(*News of the Month concluded on page* 148)

BRAND NEW!

FAR-AIR®

ROLL-KLEEN

automatic DRY FILTER

Here is a new, modern filter that combines fully automatic operation and high efficiency with large dirt holding capacity and minimum maintenance. Engineered for simplicity of operation, the Roll-Kleen offers dependable performance at low operating cost.

HOW IT WORKS

Glass fiber media with an open mesh cloth backing bonded to the downstream side, passes from the top supply roll, over the filtering area support grid, and onto the takeup roll. A preset rise in filter resistance, indicating dirty media, triggers the takeup roll drive to draw clean media completely over the support grid. This complete change-out assures maximum efficiency at all times.

PERFORMANCE

The Roll-Kleen is designed to operate at 350 to 520 fpm face velocity. Efficiency on Standardized Fine Air Cleaner Test Dust is 85% at 520 fpm and 80+% at 350 fpm.

MAINTENANCE

Other than occasional visual inspections, the Roll-Kleen is virtually maintenance-free. Warning lights (which may be located anywhere in your plant) tell when the media is dirt-loaded as well as when the media roll needs replacing.

CONSTRUCTION

Made of the finest quality components, the Roll-Kleen is available in standard widths of 3, 4 and 5 ft. and heights from 5 ft. to 15 ft. Units may be joined together to meet any CFM requirement.

Write for complete catalog information.

FARR COMPANY

LOS ANGELES • NEW YORK • CHICAGO • NEW ORLEANS

Manufacturing Licensees:
Farr Company Mfg. Ltd.
Montreal, Canada
The Clyde Engineering Co. Pty. Ltd.
Sydney, Australia
Intermit Ltd.
Birmingham, England

Originators of **FAR-AIR** *Certified Filter Service*

WE CAN DO THE WORK OF
4 MEN IN HALF THE TIME...

SAVE MONEY, TIME, TROUBLE

- Raises 100 to 4,000 lbs., as high as 18 feet
- Saves hundreds of man hours — often pays for itself on the first job
- Will not damage finished ceilings

HASTINGS HOIST-IT

COMPLETELY SAFE
Eliminates hazards of old fashioned lifting methods
UNCONDITIONALLY GUARANTEED

Write for Prices and Bulletin AV-37-H

HASTINGS AIR CONTROL, INC. 3215 Leavenworth Omaha 5, Nebraska

THE ANSWER TO ALL YOUR
CLEANING AND DESCALING PROBLEMS

A BIG TIME AND MONEY SAVER!
FOR CLEANING ALL TYPES OF CONDENSERS

COIL SURFACES — COIL TUBES
COOLING TOWERS — BLOWER WHEELS
WATER HEATERS — AIR HANDLING UNITS

FEATURES INCLUDE
ACID-RESISTANT TANKS • ACID-RESISTANT PUMPS • UNITS REVERSABLE FOR PRESSURE OR SUCTION • SNAP-ON FITTINGS • RUBBER TIRED WHEELS • STAIR-SKIDS

HASTINGS CLEAN-IT

Eliminates the hazards and mess of old-fashioned cleaning methods
UNCONDITIONALLY GUARANTEED

Write for Prices and Bulletin AV-37-C

HASTINGS AIR CONTROL, INC. 3215 Leavenworth Omaha 5, Nebraska

NOVEMBER ARI

Exposition in Chicago to be followed by shows on West Coast, in South and Southeast.

More than 60% of the exhibit space available for the Tenth Exposition of the Air-Conditioning and Refrigeration Industry in Chicago next November has been sold to member companies of the Air-Conditioning and Refrigeration Institute, Washington, D. C., sponsor of the show, it was announced by R. H. Israel, exposition committee chairman, following a committee session at which spaces were assigned.

This is far ahead of any previous exposition, and indicates that this will be the largest and most important show of its kind ever held, Mr. Israel said.

Dates for the exposition, to be staged in Chicago's International Amphitheater, are November 18, 19, 20, and 21, 1957.

Space is now being offered to non-ARI members who have exhibited in previous expositions, and will be offered for general sale early in March.

• **WEST COAST GROWING**— Meanwhile, the growing importance of the West Coast both as a manufacturing center and as a growing market for refrigeration and air-conditioning products, led the exposition committee of ARI to recommend to the Board of Directors of the Institute that every consideration be given to staging a national trade show on the West Coast sometime in 1958 under sponsorship and management of ARI.

In its discussions of a West Coast show, the exposition committee also considered the swelling population of that area and the impracticability of exhibiting at an eastern show faced by many Pacific region manufacturers, as well as the inability of many visitors from that section to attend the shows at Chicago or Atlantic City.

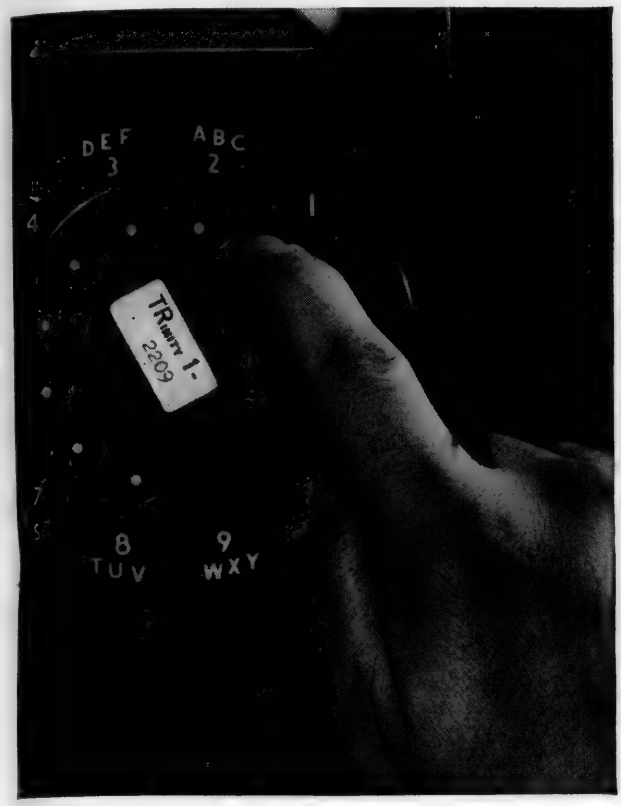
AWARD OF MERIT

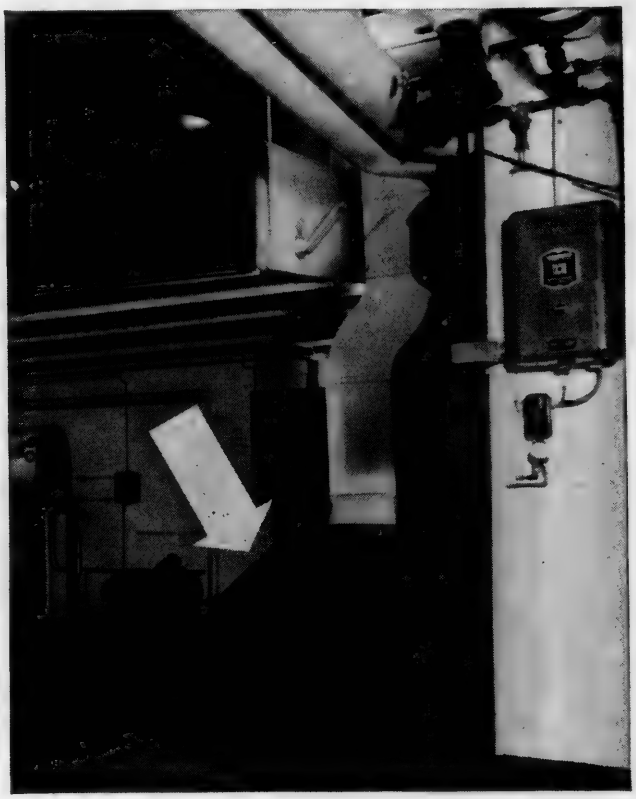
of American Gas Association is presented to John H. Eiseman, researcher on fuel gas utilization.

John H. Eiseman of the Gas Chemistry Section of the National Bureau of Standards has been given the Award of Merit of the Operating Section, American Gas Association. The honor recognizes Mr. Eiseman's extensive contributions to further the interests and promote the welfare of the industry and of the public to which it is dedicated.

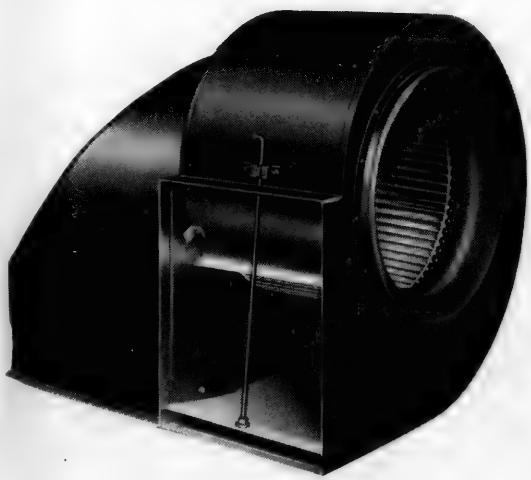
• **WORK DETAILED**—Well known in his field, Mr. Eiseman's work at NBS centers around research on the physical and chemical properties and the utilization of fuel gases. This work includes the fundamentals of burner and appliance design, the effect of variations in gas composition on the safe and efficient utilization of gases, heating value, and specific gravity as well as a number of related areas. Much of this work has been in association with AGA with whom the Bureau has cooperated for more than 30 years.

FROM TELEPHONE BOOTHS . . . TO INDUSTRIAL PLANTS





. . . here's the most versatile package unit that ever solved a ventilating problem!



American Blower Utility Set

We call them utility sets because they handle such a wide variety of ventilating problems.

Self-contained, American Blower Utility Sets, in a wide range of sizes and capacities, are used to supply or exhaust air in a wide variety of applications requiring a duct system. That means from small-capacity driers, laboratory exhaust systems, to the supply and exhaust requirements in hard-to-reach areas of public buildings, apartments, schools, hospitals, or industrial plants.

As individual package units, they are easy to install, economical to operate. And they're engineered by American Blower—specialists in the design and manufacture of air-handling and air-conditioning equipment for over 75 years. So why not call your electrical contractor or supplier today for full information; or write: American Blower Division of American-Standard, Detroit 32, Mich. In Canada: Canadian Sirocco products, Windsor, Ontario.

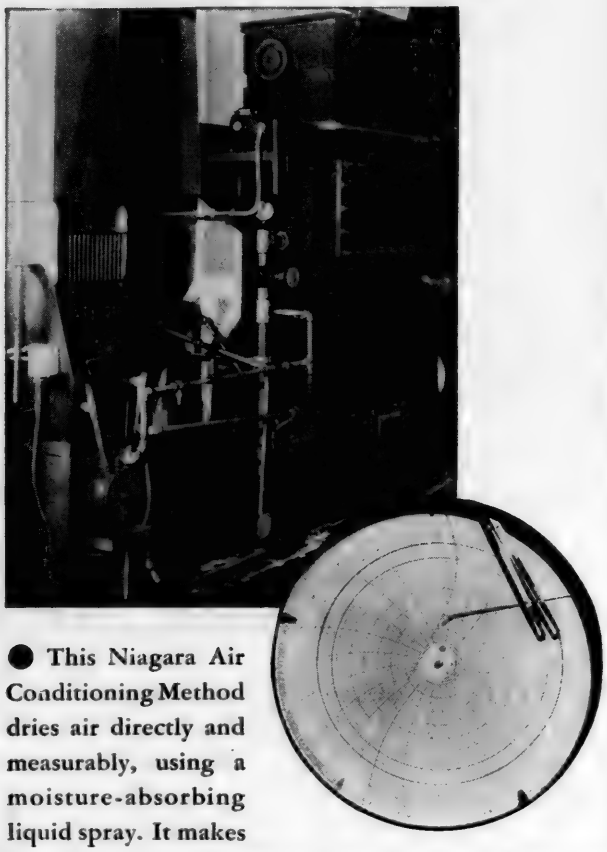
AMERICAN BLOWER

Division of AMERICAN-Standard

EXACT CONTROL

of Moisture Content

To Improve Your Product or Protect Your Materials or for Processes or Tests



● This Niagara Air Conditioning Method dries air directly and measurably, using a moisture-absorbing liquid spray. It makes humidity control a separate function from lowering or raising temperatures and gives you precise control with thermostats alone; no moisture-sensitive devices are needed. You have simpler, more trustworthy, less expensive control instrumentation. Niagara precise-control installations have the best record for reliability.

Niagara Air Conditioning provides you with any temperature and relative humidity you need. Using "Hygrol" absorbent, it is not expensive to operate, saving the refrigeration commonly used to condense moisture and making re-heat unnecessary in most cases. It gives large capacity with compact, easily-maintained equipment. Ask for Descriptive Bulletins #112 and #121. Address Dept. HV.

NIAGARA BLOWER COMPANY

405 Lexington Ave. New York 17, N. Y.

District Engineers in Principal Cities of U. S. and Canada

Canadian Degree-Days for January, 1957*

City	January 1957	January Normal**	Cumulative 1956-57	Cumulative Normal
Calgary, Alta.	1824	1530	5403	5190
Charlottetown, P.E.I.	1665	1460	4568	4310
Crescent Valley, B. C.	1593	1360	4858	4580
Edmonton, Alta.	1848	1780	5652	5850
Fort William, Ont.	2092	1830	5960	5790
Grande Prairie, Alta.	1965	1820	6062	6120
Halifax, N. S.	1404	1262	3769	3775
London, Ont.	1477	1320	4032	4000
Medicine Hat, Alta.	1939	1590	5085	5000
Moncton, N. B.	1727	1520	4914	4620
Montreal, P. Q.	1738	1590	4742	4630
North Bay, Ont.	1879	1710	4947	5330
Ottawa, Ont.	1771	1640	4915	4850
Penticton, B. C.	1526	1190	4193	3780
Prince George, B. C.	2184	1570	6074	5330
Quebec City, P. Q.	1857	1690	5346	5150
Regina, Sask.	2099	1940	6219	6090
St. John, N. B.	1668	1440	4732	4570
Saskatoon, Sask.	2072	1990	6298	6240
Timmins, Ont.	2204	1990	6244	6190
Toronto, Ont.	1375	1249	3711	3771
Vancouver, B. C.	1087	890	3355	3010
Victoria, B. C.	976	800	3203	2770
Windsor, Ont.	1384	1220	3569	3660
Winnipeg, Man.	2173	1993	6122	6023

* These data are supplied through the courtesy of the Meteorological Division Air Service Branch, Department of Transport, Canada.
** New normal figures covering 30-year period, 1921 to 1950.
The Department reports a slight revision in the figures for December, as published in last month's issue. Corrected figures are: Ottawa, Ont., 1371; St. John, N. B., 1256; Victoria, B. C., 755.

COMING EVENTS

Where listed, names or titles of individuals are those from whom further information is available

NUCLEAR CONGRESS—1957 Nuclear Congress to be held at Convention Hall, Philadelphia, Pa. Engineers Joint Council, 29 W. 39th St., New York 18, N. Y. ..... **MARCH 11-15, 1957.**

ATOMIC ENERGY CONFERENCE—Fifth conference on Atomic Energy in Industry, sponsored by the National Industrial Conference Board, at the Benjamin Franklin Hotel and Convention Hall, Philadelphia, Pa. Public information department of the National Industrial Conference Board, 460 Park Ave., New York 22, N. Y. ..... **MARCH 14-15, 1957.**

METEOROLOGICAL MEETING—151st National meeting of the American Meteorological Society, to be held at the University of Chicago, Chicago, Ill. Executive secretary of the Society, 5 Joy St., Boston 8, Mass. ..... **MARCH 19-21, 1957.**

METALS CONGRESS AND EXPOSITION—10th Western Metal Congress and Exposition, sponsored by the American Society for Metals, and other technical groups, at the Pan-Pacific Auditorium and the Ambassador Hotel, Los Angeles, Calif. W. H. Eisenman, managing director of the Society, 7301 Euclid Ave., Cleveland 3, Ohio. ..... **MARCH 25-29, 1957**

AMERICAN POWER CONFERENCE—19th annual conference sponsored by Illinois Institute of Technology in cooperation with 14 universities and technical societies at Hotel Sherman, Chicago, Ill. Secretary. E. R. Whitehead, Illinois Institute of Technology, 3300 Federal St., Chicago 16, Ill. ..... **MARCH 27-29, 1957**

GAMA MEETING—Annual meeting of the Gas Appliance Manufacturers Association, at The Greenbrier, White Sulphur Springs, West Va. H. Leigh Whitelaw, managing director of the Association, 60 E. 42nd St., New York, N. Y. ..... **APRIL 8-10, 1957**

OIL BURNING CONFERENCE—A national conference on oil burning and its equipment, sponsored by the Oil Heat Institute of America, and the mechanical engineering department at NYU, at the Gould Student Center, New York University, University Heights, Bronx, New York. C. F. Curtin, secretary of the Institute, 500 Fifth Ave., New York 36, N. Y. ..... **APRIL 15-17, 1957.**

(*Concluded on page* 152)

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Junior High in California . . . Office Building in South Carolina

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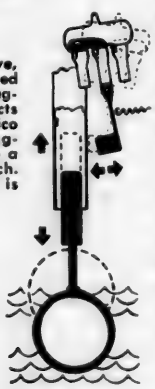

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(*Concluded from page* 150)

WARM AIR HEATING SHORT COURSE—1957 Warm Air Heating Short Course, sponsored by Purdue University, West Lafayette, Ind., to be held at the University. Prof. F. B. Morse, School of Mechanical Engineering, Purdue University, West Lafayette, Ind. ..... **APRIL 15-18, 1957.**

AIHA CONVENTION—Annual convention of the American Industrial Hygiene Association, at the Sheraton Jefferson Hotel, St. Louis, Mo. Secretary of the association, 4400 Fifth Ave., Pittsburgh 13, Pa. ..... **APRIL 22-26, 1957.**

ENVIRONMENTAL ENGINEERS MEETING—Annual technical meeting of the Institute of Environmental Engineers, at the La Salle Hotel, Chicago, Ill. H. F. Sander, president of the Institute, Vapor Heating Corp., 6420 West Howard St., Chicago Ill. ..... **APRIL 25-26, 1957.**

REFRIGERATION INSTITUTE MEETING—Annual meeting of the Air-Conditioning and Refrigeration Institute, at The Homestead, Hot Springs, Va. Executive secretary of the Institute, 1346 Connecticut Ave., N. W., Washington, D. C. ..... **MAY 6-8, 1957.**

MECHANICAL CONTRACTORS MEETING—Annual meeting of The Mechanical Contractors Association of America (formerly Heating, Piping and Air Conditioning Contractors National Association) at the Hotel Fontainebleau, Miami Beach, Fla. L. B. Gruman, Jr., secretary of the Association, 30 Rockefeller Plaza, New York 20, N. Y. ..... **MAY 7-10, 1957.**

DESIGN ENGINEERING SHOW—Design Engineering Show to be held at the Coliseum, New York City. Clapp & Poliak, Inc., 341 Madison Ave., New York 17, N. Y. ..... **MAY 20-23, 1957.**

NDHA MEETING—48th annual meeting of the National District Heating Association, at The Homestead, Hot Springs, Va. J. F. Collins, Jr., secretary-treasurer of the Association, 827 N. Euclid Ave., Pittsburgh, Pa. ..... **JUNE 3-6, 1957.**

ASRE CONVENTION—44th annual meeting of the American Society of Refrigerating Engineers, at Hotel Fountainebleau, Miami, Fla. Secretary of the Society, 234 Fifth Ave., New York 1, N. Y. ..... **JUNE 3-6, 1957.**

TECHNICAL CAREER CONFERENCE—A Technical Career Conference, sponsored by the Technical Career Council, at the Sherman Hotel, Chicago, Ill. M. W. Hinson, director of the Council, 19 S. LaSalle St., Chicago 3, Ill. ..... **JUNE 8-12, 1957.**

TESTING MATERIALS MEETING—60th annual meeting of the American Society for Testing Materials, at the Chalfonte-Haddon Hall, Atlantic City, N. J. Secretary of the Society, 1916 Race St. Philadelphia 3, Pa. ..... **JUNE 16-21, 1957.**

ASHAE MEETING—Semi-annual meeting of the American Society of Heating and Air-conditioning Engineers, Inc., at Murray Bay, Quebec. A. V. Hutchinson, executive secretary of the Society, 62 Worth St., New York 13, N. Y. ..... **JUNE 24-27, 1957.**

CIVIL ENGINEERS EXHIBIT—Annual meeting and Civil Engineering Show of the American Society of Civil Engineers at Hotel Statler, New York, N. Y. Secretary of the Society, 33 W. 39th St., New York 18, N. Y. ..... **OCTOBER 14-18, 1957.**

INDUSTRIAL DEVELOPMENT CONFERENCE—International Industrial Development Conference, sponsored jointly by Time-Life International, and Stanford Research Institute, at the Fairmount Hotel, San Francisco, Calif. E. S. Prentice, executive secretary, Stanford Research Institute, Menlo Park, Calif. ..... **OCTOBER 14-18, 1957.**

ASRE MEETING—Semi-annual meeting of the American Society of Refrigerating Engineers, at the Hotel Shoreland, Chicago, Ill. Secretary of the Society, 234 Fifth Ave., New York 1, N. Y. ..... **NOVEMBER 13-16, 1957.**

AIR-CONDITIONING AND REFRIGERATION EXPOSITION — 10th exposition of the Air-Conditioning and Refrigeration industry, sponsored by the Air-Conditioning and Refrigeration Institute, at Chicago's International Amphitheatre, Chicago, Ill. Secretary of the Institute, 1346 Connecticut Ave., N. W., Washington 6, D. C. ..... **NOVEMBER 18-21, 1957.**

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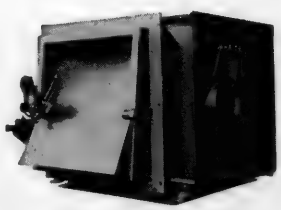

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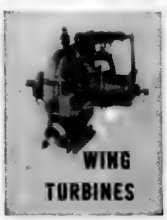

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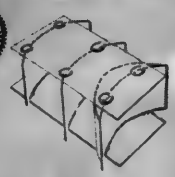

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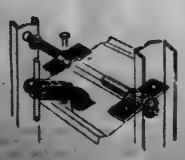

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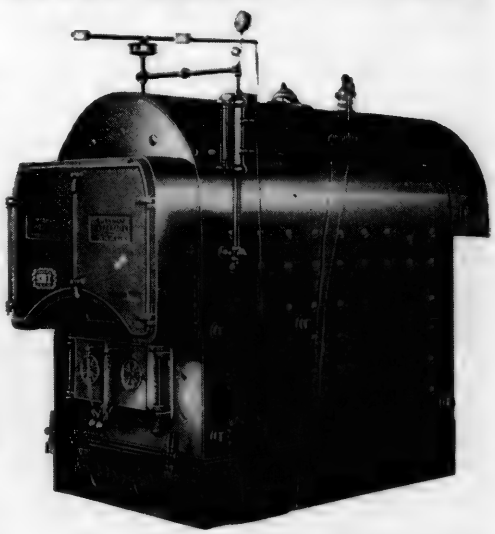

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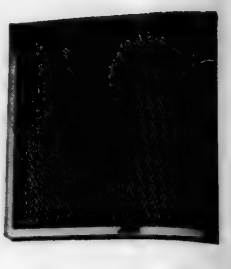

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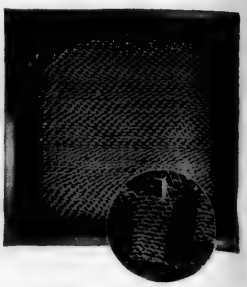

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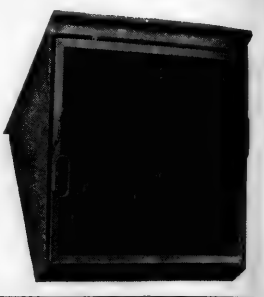

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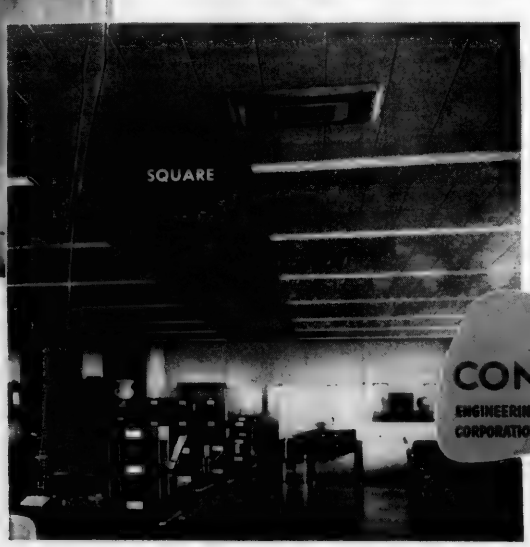

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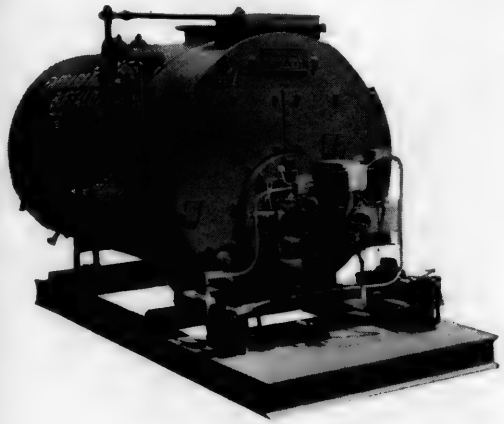

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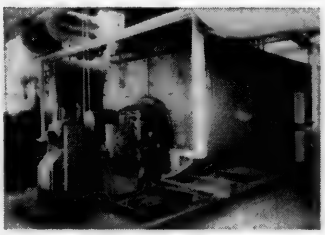

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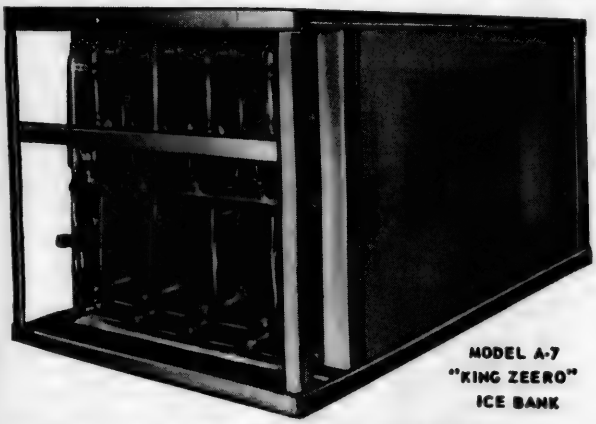

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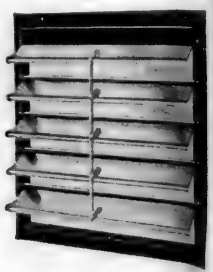

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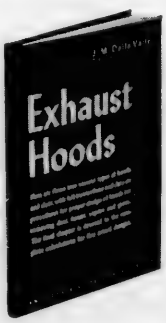

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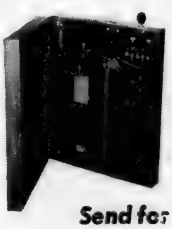

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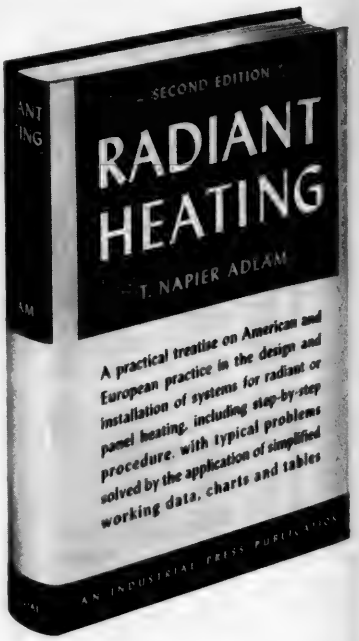
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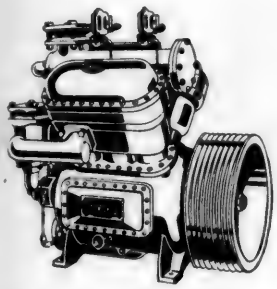

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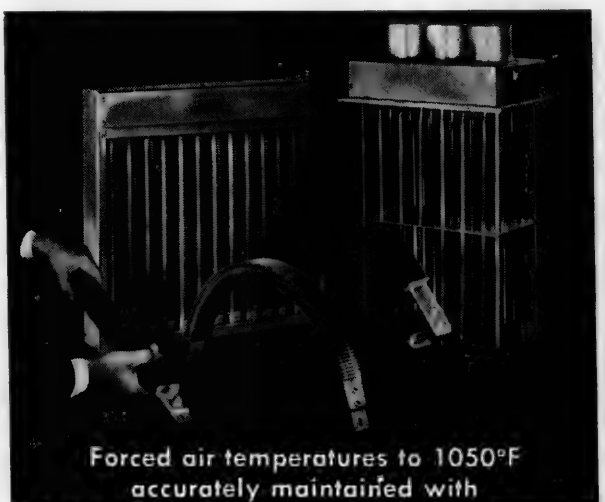

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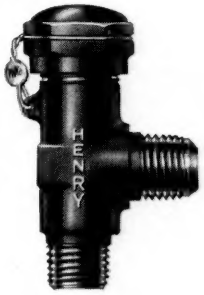

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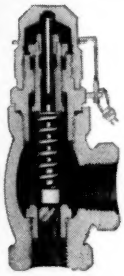

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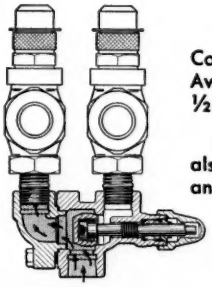

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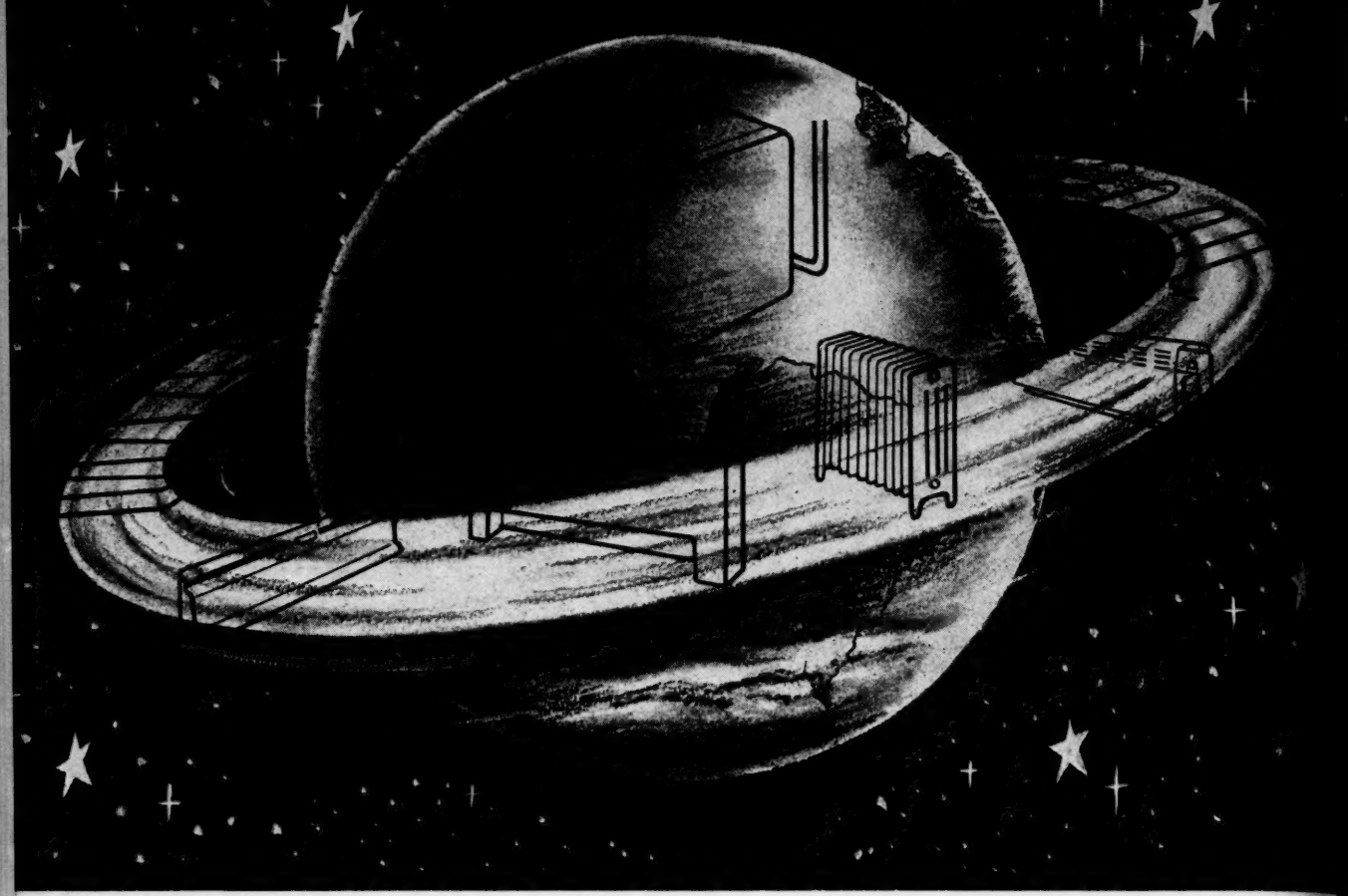

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Let's take our cue from other great industries and quit being so doggone modest in presenting the story of boiler heat. It *is* big. Let's *think* it big . . . *talk* it big . . . *make* it big!

*Thermo-dynamics is a big subject in every engineering handbook, but we can't find "auto-dynamics" in any of them!

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Doing One Thing Well

McDONNELL Boiler Water Level Controls and Safety Devices